

# **Rapa Nui Landscapes of Construction Project (LOC6)**

## **Excavation and Survey at Puna Pau 2012**



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## Rapa Nui Landscapes of Construction

The Rapa Nui Landscapes of Construction Project (LOC) is funded by a grant from the Arts and Humanities Research Council in the UK. Based at the Institute of Archaeology, University College London, the project is directed by Sue Hamilton of UCL (principal investigator) and Colin Richards of the University of Manchester (co-investigator), in collaboration with Kate Welham of Bournemouth University (co-investigator). The University of the Highlands and Islands (Project Partner) is represented by Jane Downes.

On the Island LOC works with Rapanui elders and students and in close cooperation with the *Corporacion Nacional Forestal (CONAF)*, Rapa Nui and the *Museo Antropológico P. Sebastián Englert (MAPSE)*.

The main aim of the project is to investigate the construction activities associated with the Island's famous prehistoric statues and architecture as an integrated whole. These construction activities, which include the quarrying, moving and setting up of the statues are considered in terms of Island-wide resources, social organisation and ideology.

The Project is not just concerned with reconstructing the past of the island, but is also contributing to the 'living archaeology' of the present-day community, for whom it is an integral part of their identity and their understanding and use of the island. LOC is working with the Rapanui community to provide training and help in recording, investigating and conserving their remarkable archaeological past. Fieldwork between 2008 and 2013 was undertaken under a permit issued by the *Consejo de Monumentos Nacionales*, Chile (ORN No 1699 CARTA 720 DEL 31 del 01.2008).

January/ February 2012

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# Excavation and Survey at Puna Pau, 2012

by Jane Downs & Colin Richards

## 1. Introduction

The most prominent feature of the archaeology of Rapa Nui is the large tuff statues (*moai*) that once stood upon stone platforms (*ahu*). On many *ahu* upon which *moai* were raised, the heads of the *moai* were adorned with cylinder shaped topknots (*pukao*) of red scoria. The statues that stand on the *ahu* are therefore composite in having a body of tuff and topknot of red scoria. The vast majority of *moai* are fashioned out of a distinctive yellow tuff quarried from the inner and outer surfaces of the Rano Raraku crater, which is situated in the south-east of the island. The *pukao* are fashioned from red scoria quarried from inside the crater of Puna Pau, situated in the southwest of the island. However, both quarries appear to have graduated from a number of 'local' *moai* quarries.

Mainly in fragmentary condition, a number of apparently earlier, smaller *moai* have been identified across the western area of the island. Significantly, these statues are constituted of different types of volcanic rock, including black basalt, red scoria, black scoria, yellow tuff etc. Moreover, many have been recovered from excavated *ahu* (frequently broken and incorporated in the platform structure) or within close vicinity to *ahu*, thereby indicating an earlier date.

Until now attention has mainly been focussed on Rano Raraku, which is the only quarry to have seen any form of excavation (Routledge 1919; Skjölsvold 1961; Skjölsvold & Figuerroa 1989). Detailed archaeological survey has also tended to concentrate on Rano Raraku (e.g. Routledge 1919; Skjölsvold 1961; Van Tilburg 1994), with little attention being placed on Puna Pau (but see Routledge 1919, 199, and Shepardson *et al.* 2004), and even less on other potential *moai* quarries, e.g. O'Tuu (Heyerdahl 1961, 510; plate 69d-e). As no excavation has taken place within the quarry at Puna Pau we have no idea of the depth of the debris or the workings that are concealed.

The second phase of fieldwork at Puna Pau was designed to investigate the scoria quarrying process. The specific aims of the excavation were:

- Investigate the methods of quarrying scoria.
- Locate areas of early *moai* shaping and quarrying.
- Recover artefactual evidence of tool types used in the quarrying of *pukao*.
- Note and record any decoration (e.g. petroglyphs) and tool marks.
- Collect stratified obsidian and carbon samples to provide a chronology for quarrying in the southern part of the Puna Pau crater.
- Recover environmental samples (e.g. pollen) to enable a degree of botanical reconstruction.

## 2. Location and Description

The morphology of the internal area of the crater at Puna Pau is very much a product of massive episodes of quarrying. Indeed, piles of quarrying debris actually form the shape of the interior slopes within much of the crater. There are however, some visible sections of outcropping scoria, the most pronounced of which forms part of the southern slope. Here, a 'rock-face' revealing different bands of red-scoria is visible, and it is clear that some bands or strata were exploited for *pukao* production (*Figures 1 & 2*). This location was selected for the 2012 excavation trench.



**Figure 1.**  
*The southern scoria 'rock-face'*

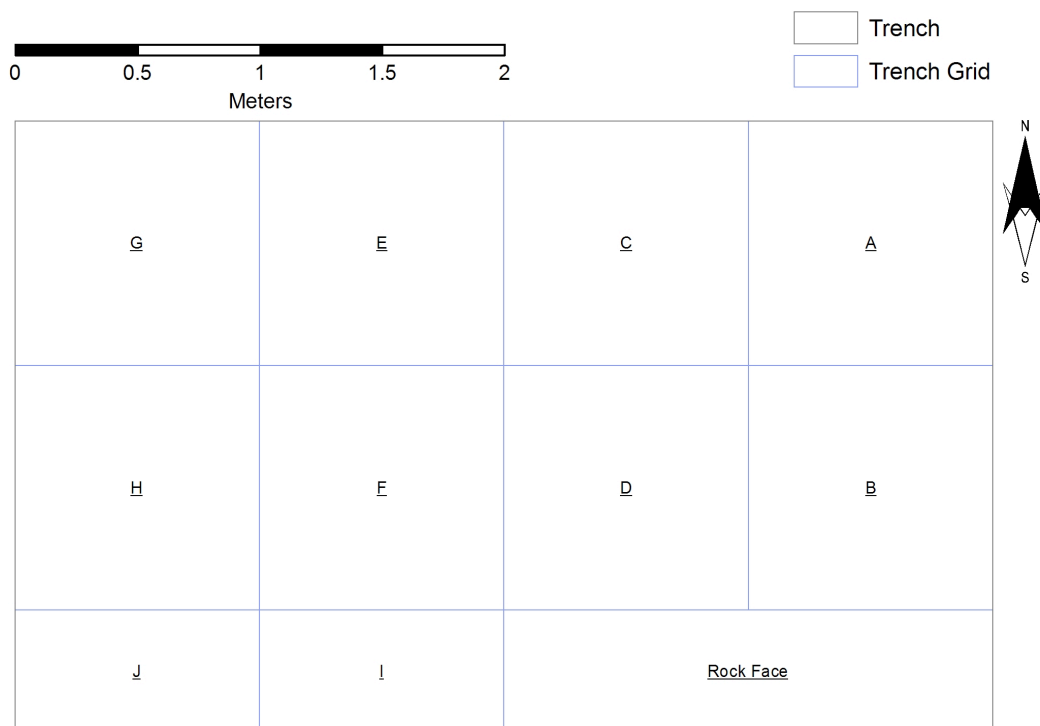
The trench (Trench 2), as initially opened, consisted of a rectangular cutting running alongside the quarried scoria face (*Figure 1*). The cutting measured 4 m x 2 m (subsequently expanded at the western end to encompass the ragged scoria face — see *Figure 1*). For purposes of recording an alphabetic grid system was imposed from the outset (*Figure 3*). All deposits were dry sieved on a 2 mm mesh. All small finds were three dimensionally recorded, as were samples for dating purposes.

The ground surface at the base of the rock-face sloped up on either side (east and west). It was clear that this was a product of debris from higher quarrying and erosion running down slope and collecting in front of the rock-face. A further factor to consider was the disparity in surface level at the front of the rock-face as demonstrated by comparing a 1955 photograph with contemporary observation (*Figure 4*). This clearly revealed a substantial build up of deposits (c. 0.5 m) over the last 57 years.





**Figure 2.**  
*Location of Trench 2*



**Figure 3.**  
*Grid system with the trench*



**Figure 4.**  
*1955 photograph of area of trench taken by Heyerdahl expedition*

The lack of a turf-line, meant excavation immediately encountered a layer of loose chippings of scoria mixed with soil [2001], which ran across the entire excavated area. This layer overlay a mid reddish-brown layer of silt and scoria chippings [2002] having a depth of 10–15 cm and punctuated by root activity. Below this layer, a similar deposit of light reddish-brown silt with a small component of scoria pieces [2003] was uncovered in the western part of the trench. Below [2003], a spread of medium sized angular blocks (6–20 cm) [2005] ran in from the eastern side of the trench. This begins a sequence of scoria deposits [2004, 2006] representing fairly recent movement of material from above through erosion of the upper slopes.

Clearly, the lower erosion deposits pre-date the Heyerdahl photograph as they no longer contain sheep bones and the removal of this material revealed a pair of circular depressions interpreted as ‘eyes’ [2025 & 2026], carved into the rock face (*Figure 5*). The ‘eyes’ are 0.3 m apart and each has a diameter of c. 0.18 m, they also have slightly protruding eyeballs. Their situation is on a slight protuberance of the rock face. Directly below the ‘eyes’ vertical tool marks became visible, seemingly an attempt to smooth the surface of the rock-face.

Below this sequence of erosion deposits, a slightly undulating level surface of yellow silty-clay [2007] was revealed in the eastern area of the trench. This varied in thickness from 2–7 cm, and represented a laid and trampled activity surface. In the western area a thick layer of scoria rubble [2010], mixed in colour and content overlay a greeny-grey ashy surface [2014]. The base of [2010], in the northwest corner, contained large quantities of finds, which almost certainly lay on the lower, silty ashy surface [2008 & 2014]. [2008 & 2014] was associated with an *umu* [2015], encountered in the north-west corner of the trench (*Figure 6*). Adjacent to the rock-face, in the central area of the



trench, a narrow layer (c. 0.3 m in width) of dry, loose, light yellow-grey medium silt [2011], was discernable. This deposit contained much charcoal. and was probably a continuation of [2014] in a drier state.



**Figure 5.**  
*Pair of carved 'eyes' [2025 & 2026] revealed in scoria rock-face*



**Figure 6.**  
*Umu [2015] in the north-west part of the trench*

The *umu* [2015], had a diameter of c. 0.9 m and a depth of 0.25 m, and was bounded by an irregularly shaped circle of stone blocks [2018]. The upper fill [2016] contained a number of charred scoria blocks [2013], *toki* fragments, *poro* hammerstones, *poro*, obsidian tools and flakes, and fire-cracked basalt flakes (SFs 220–225 & SF 227–255). A secondary fill of orange and yellow ash [2017] ran down to a basal charcoal-rich deposit [2019]. The *umu* and ashy surface represent a stable activity horizon, which marks the upper and final episode of prehistoric activity at this point in the quarry. This surface was variable in the distribution of trampled deposits, e.g. [2008] was a thinner and redder ashy deposit.

The *umu* was cut into a substantial underlying layer of bright red-orange scoria debris [2021], ranging considerably in size from fine particles to medium blocks (5–15 cm). This is undoubtedly a deposit of debris derived directly from quarrying activities. This spread sloped down from the western side of the trench. The eastern limit of this slope concurred with a large boulder of red scoria [2027] that projected out from the rock-face. From this point the scoria debris [2021] ran upslope into the eastern baulk. The whole appearance of this scoria debris [2021] is of it slumping into an unknown feature. Directly below [2021] was an inky-grey coloured dump of scoria debris [2023], which generally followed the same profile as the overlying [2021] across the trench — but had sharper and steeper edges. Again, it appeared to slump into a depression in the eastern sector of the trench. During the removal of the [2023] deposit, a void appeared in the rock-face c. 2 m from the eastern baulk. This void was subsequently revealed to be a substantial cavity, cut into the rock-face, which angled down over a distance of c. 1.2 m from the east section (*Figure 7*).

Almost certainly, the cavity is a product of quarrying and although only its upper profile, or ‘roof’ was exposed in the 2012 excavations, it was hewn at least 0.8m into the rock. Around the cavity the exposed rock-face was heavily tool marked and carefully shaped in having a slightly rounded profile. Almost abutting the entrance to the cavity was a massive lump of red scoria [2027] which continued into both the eastern baulk and below the base of the excavated trench. It is clear that the slumping observed in the layers running across the eastern area of the trench are related to the cavity and its subsequent filling of quarry debris.

To the west, the rock-face adjacent to the trench was irregular and actually cuts back in to form another slight cavity with overhanging rocks. Although not completely excavated, from the base of layer [2003], the stratigraphy within this area differed from that of the main trench. Unfortunately, a large scoria boulder (apparent in Heyerdahl’s 1955 photograph: *Figure 4*), lay at the interface of the differential stratigraphy making some relationships difficult to establish. Nonetheless, it is clear that the scoria debris [2021] and [2023] ran down towards and into the cavity. However, additional depositional events occurred within this area as further layers (e.g. [2022 & 2024]) were sandwiched between the main red [2021] and dark grey [2023] scoria debris.

Owing to the size of the trench and UK safety regulations, the 2012 excavation was halted at an average depth of 1.5 m.





**Figure 7.**  
*The cavity exposed in the rock-face, note the vertical tool marks*

### 3. Discussion

Overall, the 2012 excavation at Puna Pau was highly effective in meeting a number of the initial research aims. The excavation trench will be discussed in terms of a sequence of events from the base to the surface. Clearly, the exposed rock-face was a location of major quarrying activity. The large cavity [2028], the top of which was exposed in the eastern area of the trench, is a product of extensive quarrying activity in this area. Without further excavation the scale of this activity is difficult to establish. However, if this is a typical feature or method of *pukao* production, a number of such cavities or quarry ‘bays’ could be present and concealed below the extensive debris that covers the interior slopes of Puna Pau. Such a situation recalls the organization of quarrying *moai* at Rano Raraku. Running across the trench and into the cavity are substantial deposits of scoria debris (e.g. layers 2021 & 2023), again derived from extensive quarrying.



Directly above and around the cavity, the scoria rock-face has been shaped to a slightly rounded profile. The *toki* tool marks are extremely clear and appear as vertical strokes down the rock-face. The rounded profile is highly suggestive of *pukao* production *in-situ* — another link between *pukao* and *moai* production. The two carved ‘eyes’ [2025 & 2026] are situated directly above the cavity, and a specific association is quite likely. However, when the eyes were first recognised, the shape of the rock upon which they are carved was suggestive of the head of an ‘aberrant *moai*’ (see Heyerdahl 1961). This possibility raises the question of the earliest production of *moai* on the island. There is one identified ‘aberrant *moai*’ made of Puna Pau red scoria (at Vinapu: Heyerdahl & Ferdon 1961). Hence, Puna Pau was a source for red scoria *moai* early in the prehistory of Rapa Nui. Here it should be remembered that the earliest quarrying may not be at the greatest depth as it may well have exploited outcropping scoria at the original ground level. This level could easily be removed through the subsequent major quarrying of *pukao* and *ahu* facia slabs. Consequently, the southern rock-face may be a *loci* of early *moai* sculpting.

Above the quarry debris [2021] a fairly level occupation surface of silty clay [2008 & 2014] was laid down. An *umu* formed part of this occupation horizon, which was also associated with large quantities of flakes derived from *toki* re-sharpening. Also associated was a range of obsidian tools and flakes. Taken together, this evidence indicates broader activities, including food consumption, surrounding quarrying at a relatively late date in the history of scoria exploitation at Puna Pau.

Above this occupation horizon, deposits had built up due to erosion above and around the southern rock-face. Indeed, it was instructive to be able to demonstrate that through erosion and hillwash c. 0.5 m of material had accumulated since 1955 (see *Figure 4*).

## 4. Conclusion

The 2012 excavations were highly successful in terms of answering the research questions and, as always, invoking new questions. Despite the limited size of the trench the range of different forms of evidence provided much needed insight into quarrying activities at Puna Pau. Of especial importance, was the obtaining of dating evidence at the highest working levels and an association with cooking features. The carved ‘eyes’ may well have been a partially worked *in-situ* ‘aberrant’ *moai*, and their location and retention directly above the working cavity is of obvious significance for an understanding of subsequent quarrying of *pukao* at Puna Pau.

An range of stone artefacts involved in scoria quarrying working was recovered from the excavations ( see 6, below). This is the first assemblage from Puna Pau to be directly associated with a quarry working face. However, the trench did not reach the natural geology and further excavation at Puna Pau is highly desirable.

Excavation team: Jago Cooper (supervisor), Jane Downes, Sorababel Fati Teao, Isaías Hey Gonzalez, Sue Hamilton, Francisca Pakomio Villanueva, Colin Richards, Joaquin Soler Hotu,  
Photography: Adam Stanford

## 5. Geophysical and Topographic Survey

by Kate Welham

### *Introduction*

Puna Pau is a small hill situated between the hills of Maunga Tanga Roa and Maunga Vai Ohao to the east of Hanga Roa. The area is associated with the quarry for the production of *pukao* for the *moai* statues and lies within the bounds of the National Park managed by *CONAF*. The site is situated in a pyroclastic centre (Haase *et al.* 1997, fig. 1) and the local geology consists of red scoria with a reported magnetic susceptibility of  $0.2\text{--}0.3 \times 10^{-3}$  SI units (Fassbinder *et al.* 2007, table 1).

Puna Pau was first surveyed by Routledge (1919) who recorded the presence of 31 *pukao*, a number of which are now absent (*Figure 8*). In 2004 Brett Shepardson working with members of A-Po produced a topographic survey and photographic record of the site using the theodolite left at the museum by William Mulloy and a hand held global positioning system (GPS) (Shepardson 2004). During 2008 and 2009 geophysical and topographic survey was conducted by LOC. The work reported here is focused on the inside of the crater area (658100/ 6996102) and builds on the results previously obtained by the Project. During 2011 Puna Pau was subject to a large bush fire which caused considerable damage on site, and significantly reduced the level of vegetation particularly within the crater area. The reduced vegetation had the benefit of highlighting the variations in microtopography that had not been visible in 2008–10.

### *Methodology*

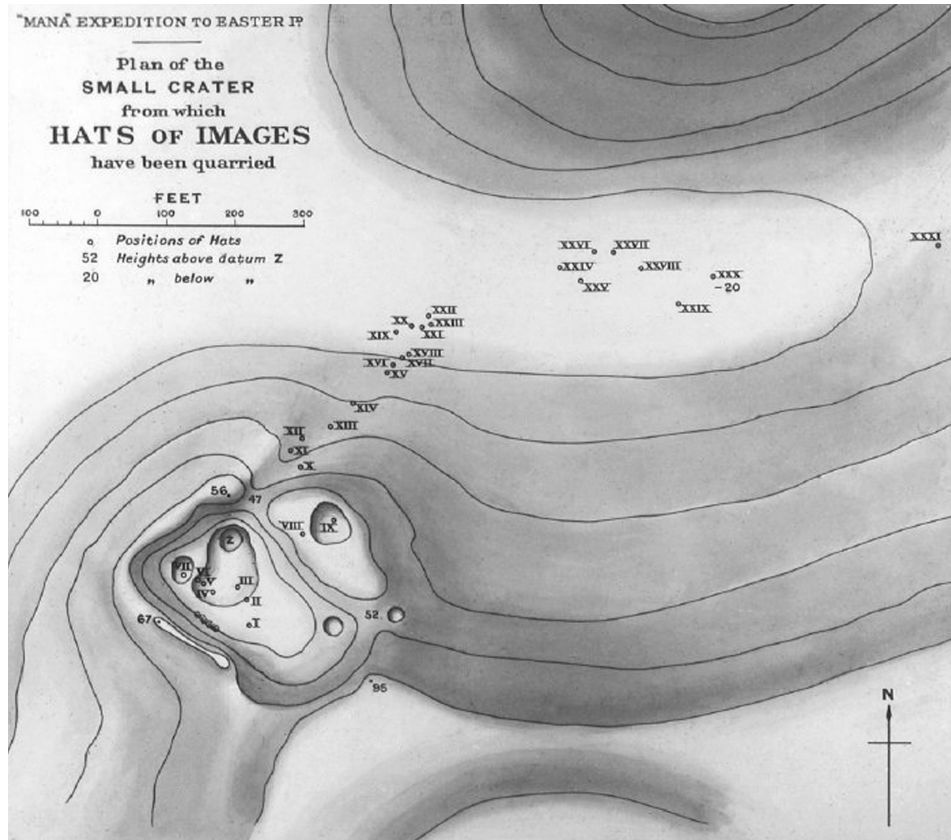
#### Topographic survey

Topographic survey was conducted inside the crater area using a differential GPS (dGPS) Leica 500 in backpack mode with readings taken every 0.2m giving an average resolution of less than 0.5m. The data were downloaded and processed in Leica GeoOffice v.8.0 and converted to SIRGAS2000 before importing into ESRI ArcGIS v.9.2.

#### Geophysical survey

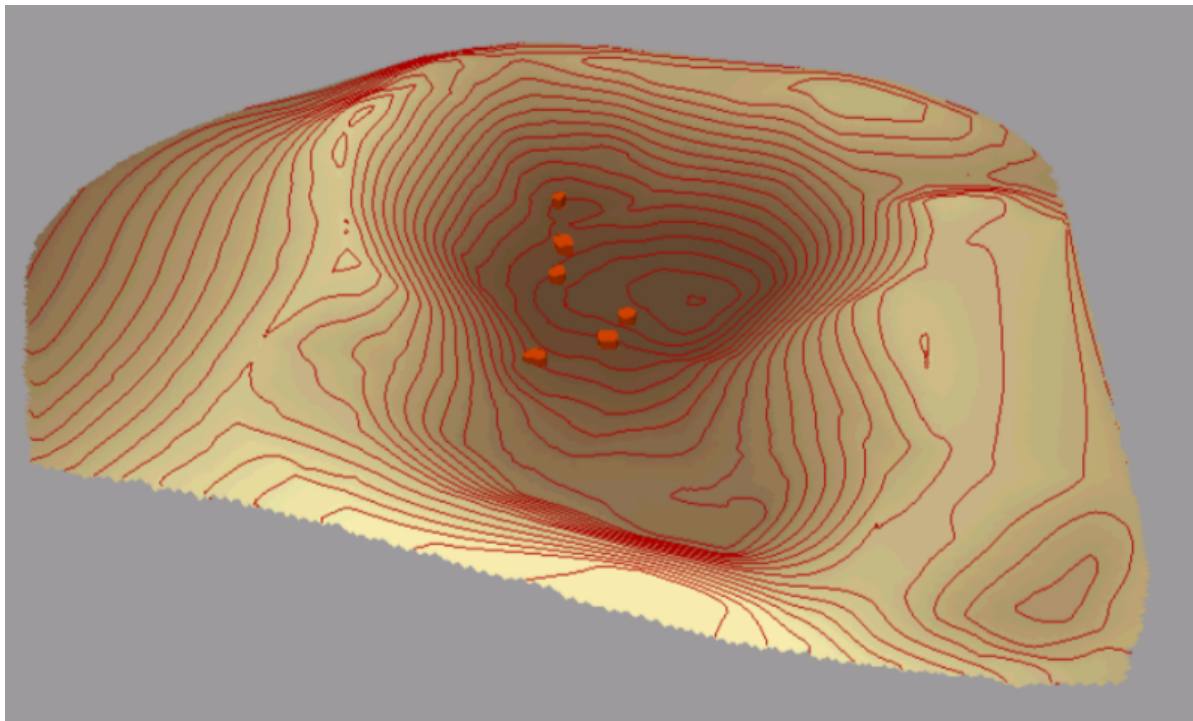
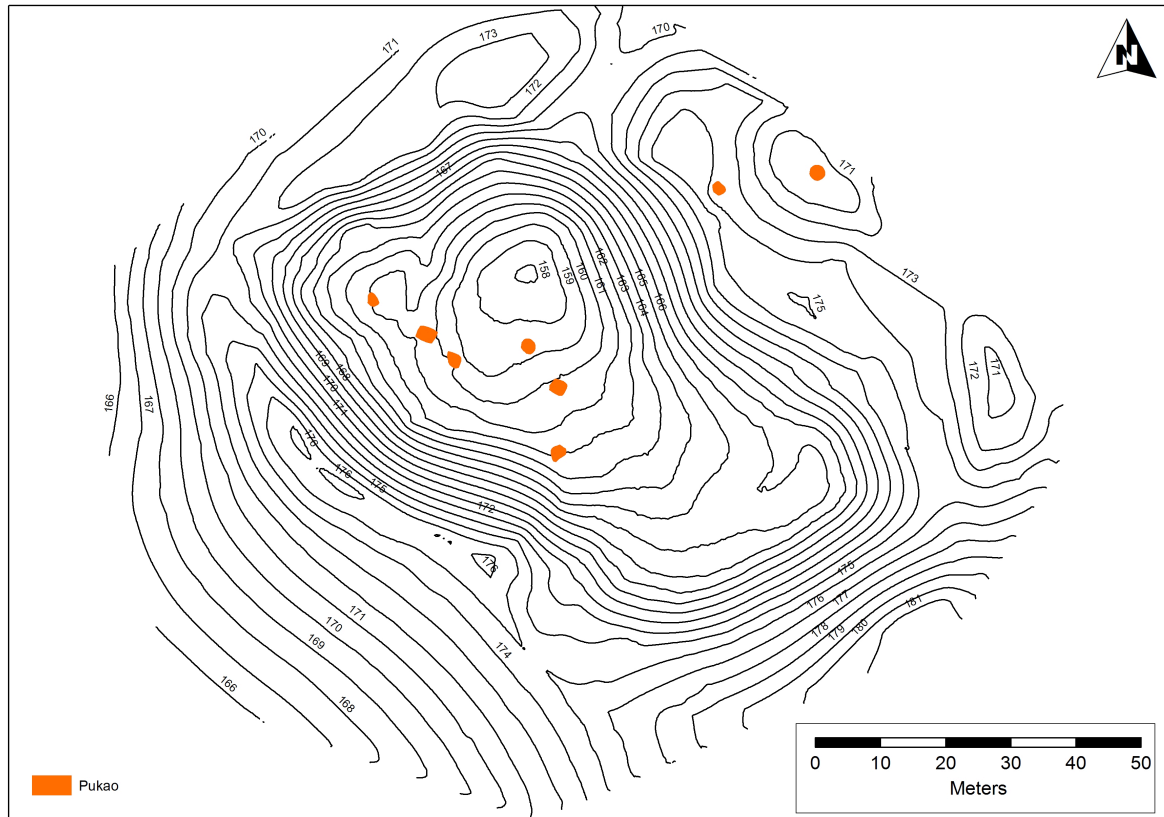
A combination of geophysical survey methods: fluxgate gradiometer, electromagnetic survey, magnetic susceptibility, and earth resistance tomography were conducted over the crater bottom. Grids for geophysical survey were located using the dGPS and data were downloaded for initial processing as above. Plans were produced in ArcGIS v9.2 using point data exported from Leica Geo Office and base map layers provided by *CONAF*. All grids were 10 m by 10 m and tomography lines 20 m in length. Fluxgate gradiometer survey was conducted using a Bartington Grad601b with readings

taken at 0.13 m intervals along north-south traverses spaced 1 m apart, at a resolution of 0.1nT, readings were taken in parallel. Electromagnetic survey was conducted using a Geonics EM38B instrument in both horizontal and vertical dipole mode. Readings were taken at 1m intervals along north-south traverses spaced 1 m apart. Data were accessed in Geonics DAT software. All data were subjected to minimal processing (e.g. despiking, zero mean traverse, and clip) in Archeosurveyor v2.5, and imported into ArcGIS v9.2 for display and production of interpretation plots. Tomography data was conducted using a TR Systems machine, exported into TR Systems propriety software.



**Figure 8.**  
*Map of Puna Pau*  
 ©Trustees of the British Museum

It should be noted that magnetic surveys south of the equator can be affected by the declination of the Earth's magnetic field, producing a different anomaly form than would be expected (Tite 1966). Due to the dominance of the development and implementation of geophysical techniques in the temperate climates of northern Europe and North America, data need to be carefully interpreted when collected in the southern hemisphere. The fluxgate gradiometer suppresses diurnal and regional effects caused by surveying south of the equator, and magnetic anomalies will appear reversed compared to those in the northern hemisphere (Tite 1966, 25). The fluxgate magnetometer data



**Figure 9.**  
Contour map and Digital Terrain Model of Puna Pau

presented here have therefore been reversed to aid interpretation. On the scale black represents negative, and white positive readings. Negative readings will generally be of more interest as they represent areas of magnetic enhancement (Tite 1966, 25).

## Results

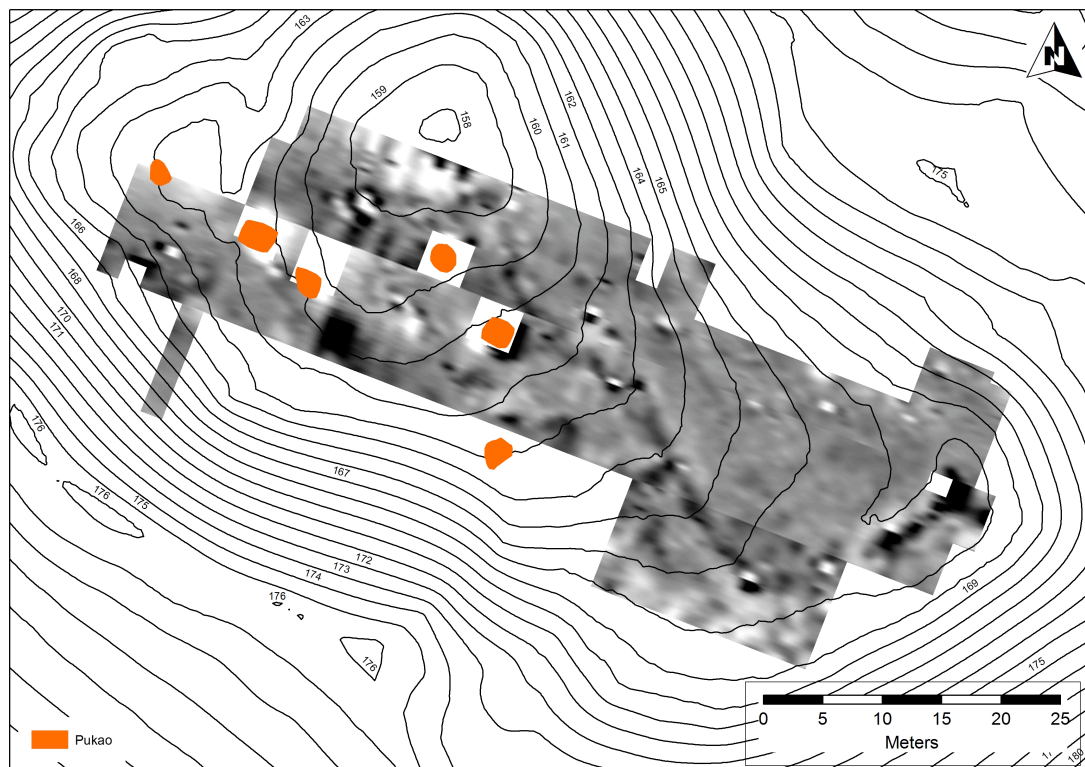
### Topographic survey

The data collected during the topographic survey were processed to form a digital elevation model (DEM) of the site (*Figure 9*). During survey a shallow depression (c. 2 m wide) was observed running north-west to south-east along the bottom of the crater and along towards the western *pukao*. This feature was clearly expressed in the topographic data and may indicate the remnants of a possible route way out of the quarry. Further processing will be conducted to combine these data with those from the previous topographic survey in 2008 and 2009 to enable the production of a complete DEM of Puna Pau.

### Geophysical Survey

#### Fluxgate gradiometer

The results of the fluxgate gradiometer survey are presented in *Figure 10*. A linear anomaly can be seen running north-west south-east that corresponds directly to the topographic feature observed above. There was very little ferrous litter observed on site, but vegetation and difficult terrain meant that the survey area had to be reduced and that some data were adversely affected difficult ground conditions.



**Figure 10.**  
*Plot of Fluxgate Magnetometer data*



#### Electromagnetic survey

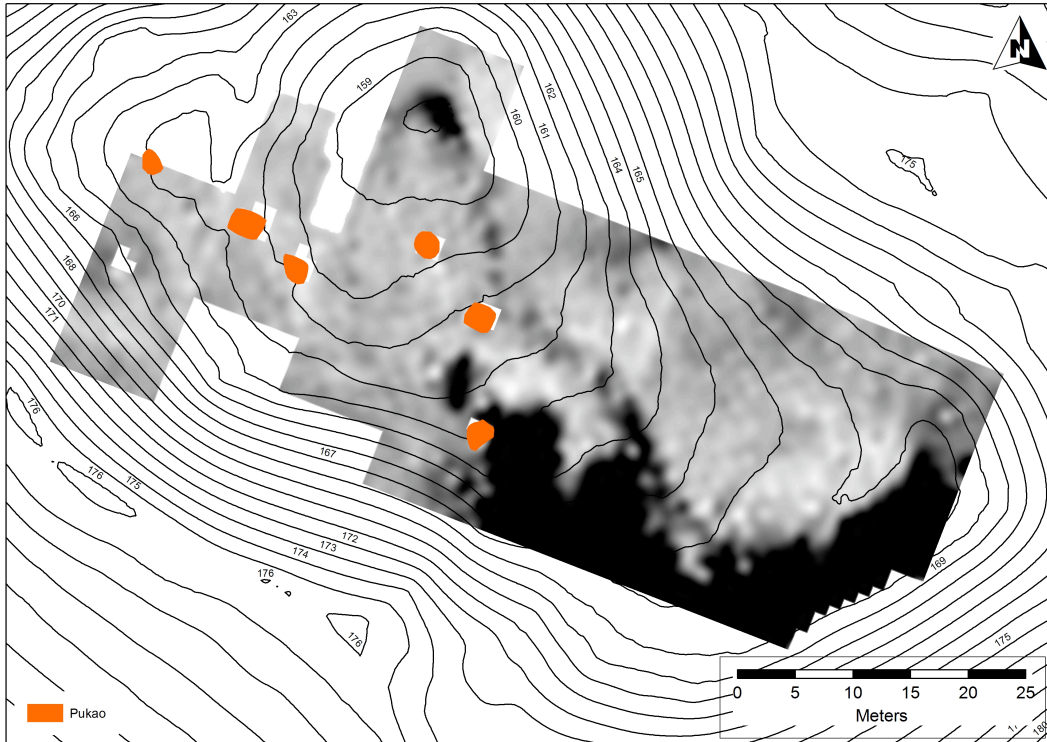
The results of the electromagnetic survey can be seen in Figures 11–14. The southern half of the survey area contains a clear change in both conductivity and magnetic susceptibility values that indicate a large amorphous anomaly probably related to a geological feature. This area corresponds directly with a steep rise in slope towards the edge of the survey area. The results from all data sets confirm the presence of the linear anomaly as observed in the topographic and fluxgate magnetometer survey results. The anomaly is clearer in the vertical mode (where there is an effective depth of c. 1.5 m).

#### Tomography survey

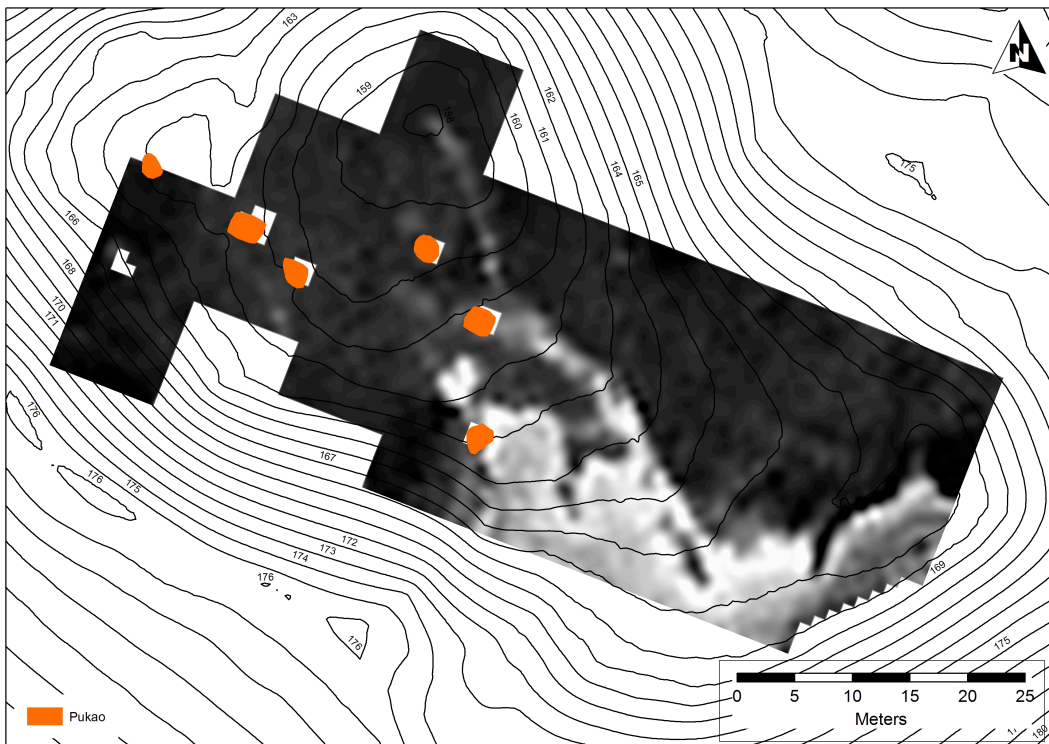
Tomography data were collected across the possible road feature as identified by the magnetic survey and across the base of the quarry (see *Figure 9*). Due to unforeseen technical problems further work is required to process these data. The results will be presented in the next report.

The combined results of the topography and geophysical survey indicate the possible presence of a *pukao* road within the quarry centre. Further work is required to determine whether this road connects with the road discovered adjacent to the excavated *pukao* in 2009.

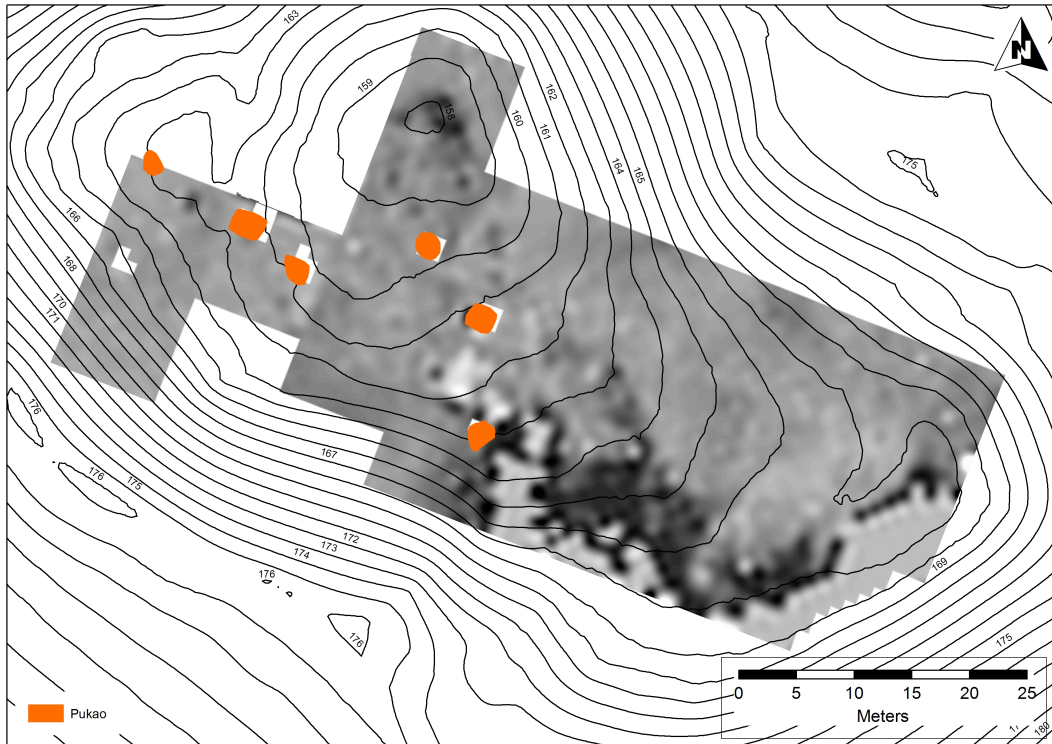
Surveyors: Isaias Hey Gonzalez, Francisca Pakomio Villanueva, Felipe Rubio, Lawrence Shaw, Joachim Soler Hotu, Alejandro Tucki Castro & Kate Welham (supervisor).



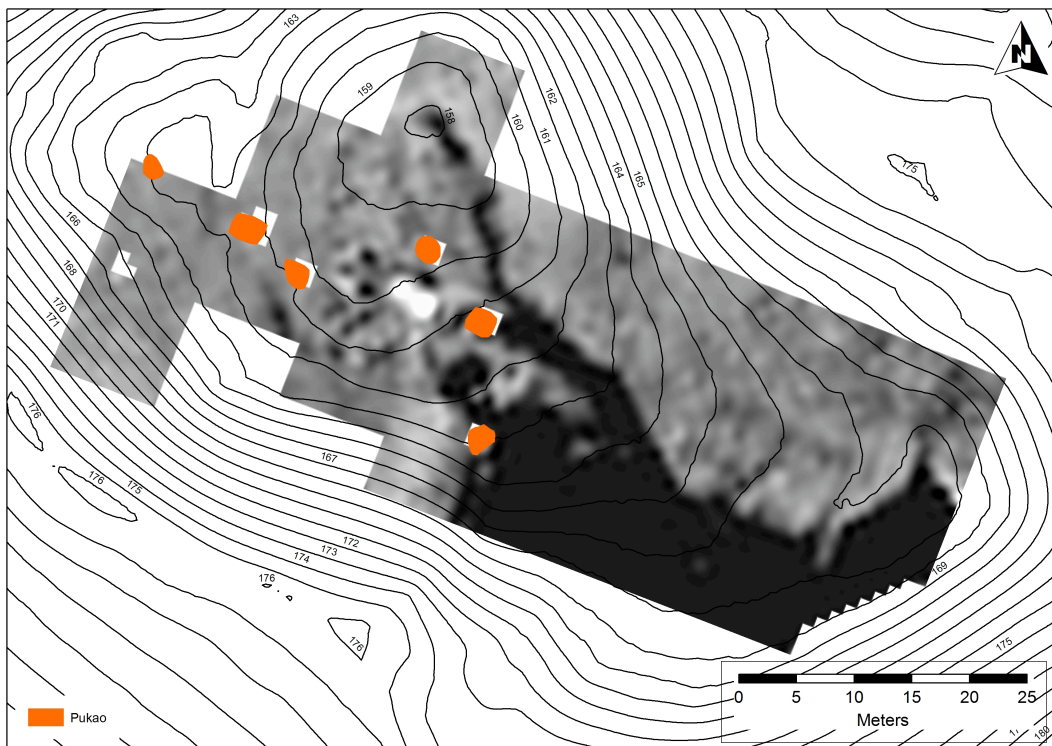
**Figure 11.**  
*Plot of Electromagnetic data: conductivity in horizontal dipole mode*



**Figure 12.**  
*Plot of Electromagnetic data: conductivity in vertical dipole mode*



**Figure 13.**  
*Plot of Electromagnetic data: magnetic susceptibility in horizontal dipole mode*



**Figure 14.**  
*Plot of Electromagnetic data: magnetic susceptibility in vertical dipole mode*

## 6. Preliminary report on the stone objects recovered from trench 2

Mike Seager Thomas

From the start of the excavations a policy of total collection and recording by context and grid square of foreign stone (stone imported into the crater from sites outside it) and utilized stone (stone — excluding scoria tailings — deliberately or incidentally modified by human activity). In addition, 260 stone finds were recorded three-dimensionally using the site's differential GPS and their intra-contextual relationships noted. It can be assumed therefore that the assemblage is fairly representative of stone using activity within the contexts excavated and — where of colluvial origin — the sediments from which these derive.

In all, 1771 stone objects were recovered, consisting primarily of broken utilized *toki* and flakes from the dressing and/ or re-dressing of these, obsidian tools and flaking debitage, and burnt stone.

### *Toki*

The bulk of the *toki*, which are flaked from a tabular flow lava that originates in the Rano Kau area, are rectangular in section (for dimensions, see Appendices) with a square, rounded or pointed blade. Heavy use has worn the ends of many of these smooth, obliterating much of the original flaking for several centimetres, clear longitudinal stria indicating both the direction of use and the coarse nature of the material on which they were used — certainly Puna Pau's red scoria. In instances where the whole blade survives, wear is symmetrical. Lighter wear extends up the surviving sides of most tools. These different wear types reflect, respectively, the way these tools were used (cutting with an adze-like motion) and the depth in the stone of this use. These inferences, it should be noted, are wholly consistent with the pattern of tool marks observed in the quarry.

In addition to the Rano Kau *toki*, individual *toki* were fashioned from: a stone similar to that from Rua Toki Toki (without breaking this particular tool, certain identification could not be made); a hard, finely vesicular lava, which appears to originate just outside the crater; and stone from close to Ahu Moto Hitara (Viringa O Tuki). The first of these, which is near whole, is of the round-sectioned type, with two pointed ends. It is very little worn.

*Toki* flakes are identified as such because they comprise the same tabular flow lava as the bulk of the *toki*, because most display a clear sub-concoidal fracture, and because a minority show evidence of pre-flake dressing and wear identical to that found on the site's *toki*. While some of these may derive from the breakage of tools during use, we infer from the high proportions of flakes without evidence of use wear and the use of dressed surfaces identical to those found on the edges of *toki* as striking platforms, that most of these result from the re-dressing of broken tools and/ or the dressing of roughed out tools.

### *Obsidian tools & debitage*

Obsidian was represented by the frosty type characteristic of the M. Orito quarries, the glossy types found on Rano Kau, and — very much a minority — the spherulitic (speckled) type found on Rano Kau. The frosty type was by far the

most common on site, but there is a suggestion — to be confirmed — that the relative proportions of frosty to glossy changes through the contexts excavated.

Throughout, a very high proportion of the obsidian shows traces of utilization — not just tools with a clearly defined type; indeed, — apart from *mata'a* and a handful of other deliberately retouched pieces (e.g. re-touched, horned 'scrapers'), there are very few definable tool types, and the overall impression is very much of a tradition of expedient use. The types of use-wear include scraper damage, where one side of an edge is chipped; cutting damage, where both sides of an edge are damaged (often difficult to distinguish from accidental damage, and therefore probably underrepresented in the counts in the Appendices); and abrasion. Of particular note is a 'spearhead'-shaped/triangular *mata'a*, with clear traces of abrasion down both sides. We have not yet identified any correspondence between obsidian type and edge damage type but, as usual on the island, the *mata'a* are of the frosty, Mt. Orito type.

### **Other tools**

The site also yielded several hammerstones with clear traces of end batter, some water rolled pebbles without end batter (perhaps used on softer obsidian), and some tools in Rano Kau lava, possibly broken from larger *toki*, with traces of post breakage smoothing, the exact use of which is currently unknown, but perhaps relates to stone finishing rather than quarrying per se.

### **Burnt stone**

The burnt stone assemblage was dominated by a hard, finely vesicular flow lava brought into the quarry area from just outside the crater but included, in addition, smaller quantities of most of the stone types used on site for tools along with a lava breccia, which occurs in layers within the site's scoria. There were also fragments of burnt *poro*, which are not otherwise represented on site. Only obsidian and scoria were avoided. The burnt stone was distinguishable as such because it was fire-cracked, and occurred as spalls. There were also traces of oxidization (most obvious in the flow lava from outside the crater) and soot-soaking. The harvesting of particular stone types for use in cooking in this way is of course wholly characteristic of hot rock cooking within the Polynesian region.

Burnt stone was common from context [2005] down, with concentrations — associated with no or only very few unburned stones — in the layer above the hearth [2013] and in the hearth's second fill [2017]. The former was dominated by cobbles, which were (mostly) clast-supported, with very few flakes and spalls, the latter by smaller spalls, the number of which decreases with increasing size. While this sequence would be characteristic of an in situ *umu*, the intervention of [2016], which was *relatively* stone free, indicates that this is not in fact the case. Rather, it would appear that the large stones comprising [2013] had been moved from a primary burnt stone feature located elsewhere; and that those comprising [2017] are what remained of an *umu* from which the stones have been removed. Thus they indicate the presence of at least two burnt stone features in the vicinity.

For the most part, these stones will not be retained, but, in consultation with MAPSE, re-buried when the excavation is closed on the 1<sup>st</sup> February, 2012).



30-odd objects have been drawn and rather more photographed in order to illustrate the points discussed above. The most diagnostic of these will be offered to *MAPSE* for permanent storage. In addition, 13 obsidian objects have been retained for obsidian hydration dating, and an additional 10 of varying form (flakes, blades, expedient pieces) for possible usewear analysis. Future work on this assemblage therefore will be based largely on the data presented in the Appendices, and focus, firstly, on its internal relationships and, secondly, its relative proportions through time as reflected by the site's stratigraphic sequence.

### Acknowledgements

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## Appendix 1. Contexts

Context no	Assoc. nos	Description
2001		topsoil 10cm thick
2002		silty layer with root inclusions
2003		humic layer cont in W half overlies red scoria (....)
2004	same as (2006)	loose red scoria tip layer in E beyond stones (2005)
2005		
2006	same as (2004)	loose red scoria tip in E half under (2005)
2007		thin spread of yellow clay/silt below (2006)
2008		orange deposit spread in and around (2007) (poss trample from (2006)?
2009		layer of sorted clinker pebble-sized scoria beneath (2007)
2010		packed layer with lots of obsidian and toki basalt interspersed with large scoria clast
2011		dark grey brown layer with much charcoal close to rock face
2012		unprovenanced surface finds
2013	(2010) & (2005)	stone cluster with in NW corner – top fill of (2015)
2014		greeny-grey to dark grey ashy spread under/abutting (2007)
2015		cut of hearth/umu
2016	[2015] & (2017)	darker top fill of hearth/umu [2015] inc matrix around (2013)
2017	[2015]	lower ashy fill of hearth/umu
2018		red scoria blocks – setting around hearth/umu
2019	[2015]	charcoal-rich lowest layer of hearth/umu
2020	beneath (2007)	medium pebble-sized scoria frags
2021	under (2014)	orange red scoria spoil with rounded frags
2022	2021	spread of grey scoria spoil within (2021)
2023		spread of grey scoria spoil spread across trench
2024		orange compacted 'surface' in SW corner
2025	2026	eye carved in rock face
2026	2025	eye carved in rock face
2027		worked red scoria boulder
2028		angled layer of red scoria debris in E side of trench

## Appendix 2. Photos

Number	Description	Scales	Orientation	Archive ref.	Date
1001	crater rim to site	people	from N		17/01/2012
1002	Excavation area pre-exc	people	from W		17/01/2012
1003	Exc vegetation clearance	people	from N		17/01/2012
1004	Crater rim end of day 1		from N		17/01/2012
1005	Crater rim end of day 1		from N		17/01/2012
1006	toki in (2002) B	N Arrow & scale	from W	829	18/01/2012
1007	toki in (2002) B	none	from W	830	18/01/2012
1008	Worked obsidian in (2002) C	N Arrow & scale	from above/west	836	18/01/2012
1009	Worked obsidian in (2002) C	none	from above/west	837	18/01/2012
1010	Trench from E baulk	2m	from E		19/01/2012
1011	rock edge detail	2m	from E		19/01/2012
1012	rock edge detail	2m	from N		19/01/2012
1013	small find toki	10cm	from above		19/01/2012
1014	trench Fati, Joaquim & toki	none	from E		19/01/2012
1015	small find toki 206	15cm	from above		19/01/2012
1016	trench aerial at end of day	2m	from above		19/01/2012
1017	small find 207	10cm	from above		20/01/2012
1018	small find 207	none	from E		20/01/2012
1019	Section south baulk	2m & 20cm	from N		20/01/2012
1020	small find 213	10cm	from above		20/01/2012
1021	Trench aerial (2004) & (2005)	2m	from above		20/01/2012
1022	small find 208	10cm	from above		20/01/2012
1023	small find 209	10cm	from above		20/01/2012
1024	small find 211	10cm	from above		20/01/2012
1025	small find 210 & 212	10cm	from above		20/01/2012
1026	small find 212	10cm			23/01/2012
1027	small find 214	20cm			23/01/2012
1028	section SW corner Thor's stone	20cm	from E		23/01/2012
1029	small find 216	10cm			23/01/2012
1030	small find 215	10cm			23/01/2012
1031	small find 217	10cm			23/01/2012
1032	small find 218	10cm			23/01/2012
1033	yellow layer (2007)	10cm			23/01/2012
1034	small find 219	10cm			23/01/2012
1035	cluster of sfs NW	25cm			23/01/2012

Number	Description	Scales	Orientation	Archive ref.	Date
	corner of trench				
1036	sfs 221, 222, 229, 223	25cm			23/01/2012
1037	sfs 224 & 225	15cm			23/01/2012
1038	cluster of sfs	25 & 15cm	from E		23/01/2012
1039	diff GPS working shot		from E		23/01/2012
1040	sample for palaeoenv	trowel	from N		23/01/2012
1041	yellow (2007) & orange burning (2008)	1m	from N		23/01/2012
1042	trowelled back around cluster (2010)	1m	from E		23/01/2012
1043	section of E baullk	1m	from W		23/01/2012
1044	end of day aerial	2m	from above		23/01/2012
1045	small find 226	trowel			23/01/2012
1046	aerial post-clean	2m	from above		24/01/2012
1047	aerial (2013)	1m	from above		24/01/2012
1048	Fran planning working shot	1m	from above		24/01/2012
1049	trench with (2018)	2m & 1m	from above		24/01/2012
1050	trench NW corner	2m & 1m	from above		24/01/2012
1051	hearth umu stones (2018)	2m & 1m	from above		24/01/2012
1052	trench	2m & 1m	from E		24/01/2012
1053	detail of yellow (2017)	trowel	from above		24/01/2012
1054	section hearth/umu (2016) (2017) (2019)	15cm & 1m	from E		24/01/2012
1055	section umu (2016) (2017) (2019)		from E		24/01/2012
1056	half sectioned heath/umu (2018) & [2015]		from E		24/01/2012
1057	completed excavation of [2015]	1m	from N		25/01/2012
1058	working shot excavation of (2007)	Felipe	from N		25/01/2012
1059	S section showing (2014)	15cm	from N		25/01/2012
1060	small find 256	15cm	from S		25/01/2012
1061	small find 256	15cm	from S		25/01/2012
1062	E facing section				31/01/2012
1063	E facing section				31/01/2012
1064					31/01/2012
1065					31/01/2012
1066					31/01/2012
1067					31/01/2012
1068					31/01/2012
1069					31/01/2012
1070	small find 262				31/01/2012

### Appendix 3. Samples

Sample no	Context no	SF no	Volume	Sample type/purpose	Context description & notes
188	2002 (H)		1 rough flake	for usewear analysis	UW38
189	2003 (E)		1 rough flake	for usewear analysis	UW39
190	2003 (E)		1 mataa (complete but broken in two pces)	for usewear analysis	UW40
191	2003 (E)		1 rough blade	for usewear analysis	UW41
192	2003 (H)		1 rough blade	for usewear analysis	UW42
193	2003 (H)	207	1 mataa (stem missing)	for usewear analysis	UW43
194	2004	209	1 retouched tool	for usewear analysis	UW44
195	2005 (E)	213	1 ?unfinished mataa/retouched tool	for usewear analysis	UW45
196	2005 (F)		1 rough flake	for usewear analysis	UW46
197	2006 (G)		1 rough flake	for usewear analysis	UW47
198	2006 (G)		1 rough flake	for usewear analysis	UW48
199	2010 (G)		1 rough flake	for usewear analysis	UW49
200	2013 (G)		1 retouched tool	for usewear analysis	UW50
201	2007		<1 ltr	small bulk multi analysis	sieved and discarded
202	2008		<1 ltr	small bulk multi analysis	sieved and discarded
203	2009		<1 ltr	small bulk multi analysis	sieved and discarded
204	2007		<1 ltr	small bulk multi analysis	sieved and discarded
205	2007		<1 ltr	small bulk multi analysis	sieved and discarded
206	2008		<1 ltr	small bulk multi analysis	sieved and discarded
207	2010		<1 ltr	small bulk multi analysis	sieved and discarded
208	2010		<1 ltr	small bulk multi analysis	sieved and discarded
209	2010		<1 ltr	small bulk multi analysis	RC1
210	2011		<1 ltr	small bulk multi analysis	RC2
211	2016		<1 ltr	bulk sediment	RC3



Sample no	Context no	SF no	Volume	Sample type/purpose	Context description & notes
212	2017		<1 ltr	bulk sediment	RC4
213	2019		<1 ltr	bulk sediment	RC5
214	2007B		<500g	soil block	S1
215	2007D		1 pce	charcoal frag	RC6
216	2007D		1 pce	charcoal frag	RC7
217	2014F		1 pce	charcoal frag	RC8
218	2014		1 pce	charcoal frag	RC9
219	2008		frags	charcoal	RC10
220	2021		3 pces	charcoal C14	RC11
221	2006		125 gms	for pollen	P1
222	two 0 one four		125 gms	for pollen	P2
223	2021		top 125 gms	for pollen	P3
224	2021		middle 70 gms	for pollen	P4
225	2021		bottom 80 gms	for pollen	P5
226	2022		125 gms	for pollen	P6
227	2023		50 gms	for pollen	P7
228	2005F		1	for OHD	OHD1 Orito-type
229	2005E		1	for OHD	OHD2
230	2006E		1	for OHD	OHD3 Orito-type
231	2007	256	1	for OHD	OHD4 Orito-type
232	2009		1	for OHD	OHD5 Orito-type
233	2011		1	for OHD	OHD6 Rano Kau-type
234	2014E		1	for OHD	OHD7 Rano Kau-type
235	2016G		1	for OHD	OHD8 Rano Kau-type
236	2010		1	for OHD	OHD9 Orito-type
237	2020B		1	for OHD	OHD10 Orito-type
238	2021D		1	for OHD	OHD11 Orito or Motu Iti- type
239	2023		1	for OHD	OHD12
240	2024		1	for OHD	OHD13 Rano Kau- type
241	2014			charcoal C14	RC12
242	2021			charcoal C14	RC13
243	2021			charcoal C14	RC14
244	2021 (H)			charcoal C14	RC15

#### Appendix 4. Small finds

Finds no	Context	Subd letter	Type	Drawing no (site not finds drawing)
201	2002		obsidian	
202	2002		toki flow lava	
203	2002		obsidian	
204	2002		pebble	
205	2003		toki flow lava frag	
206	2003	C	toki flow lava frag	
207	2003	H	obsidian point	
208	2003		toki flow lava frag	
209	2004		obsidian flake	
210	2004		pebble	
211	2005		toki flow lava frag	
212	2004	A	toki flow lava frag	
213	2005	E	obsidian	
214	2005	F	discarded	
215	2005	F	toki point	
216	2005	E	obsidian tool broken	
217	2005	H	obsidian large worked piece	
218	2005	G	obsidian large worked piece	
219	2006	B	toki flow lava frag	
220	2013	G	toki flow lava frag	
221	2013	G	toki flow lava frag	
222	2013	G	pebble hammer stone	
223	2013	G	pebble hammer stone	4
224	2013	G	toki flow lava frag	4
225	2013	C	toki flow lava frag	4
226	2007	C	toki flow lava frag	4
227	2013	A	toki flow lava flake	
228	2013	G	toki flow lava flake	5
229	2013	G	poro hammer broken	5
230	2013	G	toki flow lava flake	5
231	2013	G	toki flow lava flake	5
232	2013	G	toki flow lava flake	5
233	2013	G	toki flow lava flake	5
234	2013	G	obsidian	5
235	2013	G	toki flow lava flake	5
236	2013	G	toki flow lava flake	5
237	2013	G	toki flow lava	5
238	2013	G	toki flow lava	5
239	2013	G	toki flow lava hammerstone	5
240	2013	G	toki flow lava flake burnt	5
241	2013	G	toki flow lava flake	5

<b>Finds no</b>	<b>Context</b>	<b>Subd letter</b>	<b>Type</b>	<b>Drawing no (site not finds drawing)</b>
242	2013	G	toki flow lava flake	5
243	2013	G	toki flow lava fragment	5
244	2013	G	toki flow lava frag	5
245	2013	G	toki flow lava frag burnt	5
246	2013	G	discarded	
247	2013	G	toki flow lava frag burnt	6
248	2013	G	toki flow lava	6
249	2013	G	poro hammer broken	6
250	2013	G	toki flow lava fragment large	6
251	2013	G	toki flow lava frag	6
252	2013	G	flow lava frag burnt	6
253	2013	G	toki flow lava frag	6
254	2013	G	toki flow lava frag	6
255	2013	G	toki flow lava frag	
256	2007	D	obsidian	
257	2020	B	obsidian (for dating)	
258	2021		obsidian (for dating)	
259	2010		obsidian (for dating)	
260	2021		flow lava worked point	
261	2021		toki flow lava frag	
262		Sec 3	obsidian (for dating)	9

## Appendix 5. Drawings

Drawing no	Sheet no	Section	Plan	Description	Scale
1			yes	pre-ex Tr2 12 levels	01:20
2			yes	plan of (2002) first clean	01:20
3			yes	plan of (2005) & (2004)	01:20
4			yes	plan of (2007), (2008), (2009), (2010), (2011)	01:20
5			yes	plan of (2013) 1/2	01:10
6	6		yes	plan of 2013 2/2	01:10
7	6	yes		Section of (2018), (2017) & (2015)	01:10
8		yes		N facing section	01:10
9		yes		S facing section	01:10
10		yes		E facing section	01:10
11		yes		W facing section	01:10

## Appendix 6. Bone and shell

Context	Shell/bone
2007A	Two bone pieces too small to identify
2007B	One near complete cowrie ( <i>cypraea sp.</i> ) shell and two other pieces
2020A	One unidentifiable gastropod and one crab claw
2020B	Fishbone & (sent for identification to J. Harland) and one Black nerite shell ( <i>Nerita morio</i> ) — juvenile possibly with a hole for stringing



## Appendix 8: Catalogue of stone finds

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2001	n/a	n/a	obsidian	glossy	Kau	rough flake	1	7x17x25	none	none	no
2002	a	n/a	obsidian	glossy	Kau	chips	3	granule	none	none	no
2002	a	n/a	obsidian	frosty	Orito	chip	1	granule	none	none	no
2002	a	n/a	flow lava	tabular	Kau	rough flake	1	6x40x60	none	none	no
2002	a	n/a	flow lava	tabular	Kau	rough blade	1	2x5x31	none	none	no
2002	a	n/a	flow lava	tabular/vesicular	outside crater	chip & rough blade	2	6x12x20 & 6x41x46	none	not obviously artefactual	no
2002	a	201	obsidian	frosty	Orito	rough utilized flake	1	9x25x33	scraping damage	none	no
2002	b	202	flow lava	tabular	Kau	toki fragment	1	21x88x90	possible rounding on unbroken, worked edges	2 transverse fractures	no
2002	c	n/a	flow lava	tabular	Kau	blade fragment	1	6x18x23	none	none	no
2002	c	n/a	flow lava	tabular/vesicular	outside crater	chip	1	3x8x18	none	none	no
2002	c	203	obsidian	frosty	Orito	rough flake	1	17x30x44	no	retains cortex	no
2002	n/a	204	flow lava	weakly porphyritic	south coast	(?) hammerstone — water-rolled	1	large elongate pebble	fractured at one end	heavily weathered subsequent to fracturing	no
2002	e	n/a	flow lava	hard	possibly Viringa o Tuki	very rough flake	1	15x31x60	none	none	no
2002	f	n/a	obsidian	frosty	Orito	rough (?)utilized flake	1	4x20x22	possible scraping damage	none	no
2002	h	n/a	flow lava	tabular	Kau	toki fragment with pointed working edge	1	15x45x55	smoothed edge with faint stria at right angles to point of tool	none	yes/ yes

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2002	h	n/a	obsidian	glossy	Kau	(?)utilized flake	1	8x35x37	possible scraping damage	none	no
2002	h	n/a	obsidian	glossy	Kau	chip	1	granule	none	none	no
2002	h	n/a	obsidian	frosty	Orito	chip	1	granule	none	none	no
2002	h	n/a	flow lava	hard	possibly Viringa o Tuki	chip/ very rough flake	1	9x19x24	none	none	no
2003	c	n/a	flow lava	tabular	Kau	flake	1	7x45x52	none	none	no
2003	c	205	flow lava	tabular	Kau	probable toki fragment	1	28x52x80	none	possible deliberately smoothed facet	no
2003	c	206	flow lava	tabular	Kau	broken toki with pointed working edge	1	45x79x120	smoothed edge with stria at right-angles to point of tool	none	yes/ yes
2003	c	208	flow lava	tabular	Kau	broken toki with squared working edge	1	55x77x140	smoothed edge with stria at right-angles to blade of tool	none	yes/ yes
2003	e	n/a	obsidian	frosty	Orito	mata'a (spade shaped)	1	13x40 (blade width)x48. Tang 19	possible cutting damage to 'spade' edge	damaged; notch taken out of corner of blade	no; yes
2003	e	n/a	obsidian	frosty	Orito	discoidal flake/ horned scraper	1	10x28x31	heavy, possible scraping damage between horns; light wear on opposing edge	striking platform re-touched to form horns	no; yes
2003	e	n/a	obsidian	frosty	Orito	rough flake	1	16x43x70	nothing unambiguous	striking platform re-touched to form horns	no
2003	e	n/a	obsidian	frosty	Orito	rough blade	1	14x28x69	none	cortex on one side	no
2003	e	n/a	obsidian	frosty	Orito	utilized discoidal flake	1	8x30x36	scraping damage all around edge except platform	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2003	e	n/a	obsidian	frosty	Orito	rough (?utilized core rejuvenation) flake	1	17x34x55	possible rough scraping on one edge	blunted striking platform	no
2003	e	n/a	obsidian	frosty/ tabular	Orito	roughly flaked (?utilized core	1	15x55x80	rough (?) cutting damage on one edge	cortex on 3 faces	no
2003	e	n/a	obsidian	glossy-frosty	none	chip	1	10x15x28	none	none	no
2003	e	n/a	flow lava	tabular	Kau	flakes	3	8x40x50, 7x44x55 & 16x50x97	none	none	no
2003	e	n/a	flow lava	porphyritic, tabular with sparse voids	none	flake	1	9x60x70	none	none	no
2003	f	n/a	obsidian	frosty	Orito	(?)utilized flake	1	9x23x32	light, possible cutting damage on long edge	none	no
2003	f	n/a	obsidian	glossy	Kau	broken micro-blade	1	1x7x9	none	none	no
2003	f	n/a	obsidian	frosty	Orito	rough flake (T-shaped)	1	5x26x37	none	none	no
2003	g	n/a	obsidian	frosty	Orito	rough utilized blade	1	3x13x26	scraping damage on long edge	none	no
2003	g	n/a	obsidian	frosty	Orito	rough flake	1	5x19x38	none	none	no
2003	g	n/a	obsidian	frosty/ tabular	Orito	'borer'/'graver'	1	5x27x31	unclear	cortex on three faces; retouched at point	no
2003	g	n/a	flow lava (hard)	water rolled pebble	beach	(?) hammerstone	1	large pebble-size	none	split longitudinally	no
2003	h	n/a	obsidian	glossy	Kau	utilized blade	1	5x24x46	light cutting damage on at least one edge characterized by chipping on one side and abrasion on the other	none	no
2003	h	n/a	obsidian	frosty	Orito	utilized blade	1	5x21x51	cutting damage on one edge	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2003	h	n/a	obsidian	glossy	Kau	broken utilized flake	1	10x36x42	cutting damage on one edge	cortex used as striking platform	no
2003	h	n/a	obsidian	frosty	Orito	broken utilized flake	1	14x40x41	cutting damage on two edges	cortex used as striking platform	no
2003	h	n/a	obsidian	frosty	Orito	rough flakes / cores	2	20x40x40 & 17x35x68	uncertain	none	no
2003	h	n/a	obsidian	frosty	Orito	chips	2	7x9x11 & 16x16x30	none	the larger possibly a rejuvenation flake from a blunted core	no
2003	h	n/a	obsidian	frosty	Orito	rough flakes	3	2x15x22, 2x15x17 & 5x21x31	none	none	no
2003	h	n/a	obsidian	frosty-glossy	none	rough flake	1	3x11x15	none	none	no
2003	h	n/a	obsidian	frosty	Orito	rough blades with trianglular section	2	5x15x31 & 5x8x27	smaller has possible abrasion along one edge	none	no
2003	h	n/a	obsidian	glossy	Kau	chip	1	granule	none	none	no
2003	h	n/a	obsidian	frosty	Orito	chips	2	granules	none	none	no
2003	h	n/a	obsidian	glossy	Kau	micro-flakes	2	granules	none	none	no
2003	h	n/a	obsidian	frosty	Orito	micro-flakes	6	granules	none	none	no
2003	h	n/a	obsidian	glossy with phenocrysts	Kau	rough core	1	30x40x60	none	much cortex	no
2003	h	207	obsidian	frosty	Orito	pointed mata'a	1	11x51x73	clear edge abrasion/ stria all along both sides of the point on its positive face	tang broken	yes/ yes
2003	h	207	flow lava	tabular	Kau	rough flake	1	17x41x51	none	none	no
2003	j	n/a	obsidian	frosty	Orito	flakes	2	9x29x48 & 5x24x45	the larger has an abraded horn	none	no
2003	j	n/a	obsidian	frosty	Orito	micro-flakes	4	1x4x10-2x11x20	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2003	j	n/a	flow lava	tabular	Kau	flakes	2	10x42x45 & 14x39x78	none	none	no
2004	a	n/a	obsidian	frosty	Orito	rough flake	1	6x14x22	none	some cortex	no
2004	a	210	flow lava	water-rolled — hard & non-vesicular	beach	foreign	1	medium to large pebble	none	sub-round with beak. Could be a hammer for softer obsidian	no
2004	a	212	flow lava	tabular	Kau	working end of toki squared blade with wedge-shaped profile))	1	40x67x177	smoothed blade with clear longitudinal stria; faint wear present along the whole unbroken tool		
2004	b	n/a	obsidian	frosty	Orito	retouched chip	1	14x15x24	blunted/ re-touched around pointed end	none	no
2004	b	n/a	flow lava	tabular	Kau	flakes & rough flakes	3	7x32x38, 9x35x41 & 6x44x65	none	none	no
2004	b	n/a	flow lava	tabular	Kau	flakes & rough flakes	3	3x19x29, 32x20x29 & 11x30x61	traces of smoothing	flakes from tip(s) of toki(s)	no
2004	b	n/a	flow lava	?local breccia	Puna Pau	rough flake (several strikes)	1	11x39x66	none	none	no
2004	b	n/a	obsidian	glossy	Kau	retouched flake (triangular)	1	12x31x42	retouched along one edge; adjacent point possibly slightly worn	none	yes/ yes
2005	n/a	211	flow lava	tabular	Kau	working end of toki (squared blade)	1	28x68 (wide)x110 (long)	roughly chipped end and sides retouched from earlier, worn tool (shown by single v. sooth facet); light wear	none	yes/ yes
2005	a	n/a	obsidian	glossy	Kau	chip	1	11x20x28	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2005	a	n/a	flow lava	tabular	Kau	rough flakes	2	5x44x54 & 15x55x108	smaller has faint pre-flaking smoothing	none	no
2005	c	n/a	obsidian	glossy	Kau	rough utilized flake	1	12x29x47	scrapping (?) & cutting wear	none	no
2005	c	n/a	obsidian	frosty	Orito	rough flake	1	5x27x33	none	none	no
2005	c	n/a	flow lava	tabular	Kau	rough flake	1	11x45x65	faint pre-flaking smoothing	flake from tip of tok	
2005	c	n/a	flow lava	tabular	Kau	rough flake	1	12x29x41	none	none	no
2005	c	n/a	flow lava	tabular	Kau	chip	1	granule	none	none	no
2005	e	n/a	obsidian	glossy	Kau	(?) utilized flake	1	2x16x18	possible wear	none	no
2005	e	n/a	obsidian	glossy	Kau	rough, retouched flake (triangular)	1	9x25x39	one edge deliberately blunted; possible scraper damage on another	none	oh/ no
2005	e	n/a	obsidian	glossy	Kau	chip	1	12x14x21	none	none	no
2005	e	n/a	obsidian	frosty	Orito	rough (?) utilized flake	1	6x17x21	possible wear on 1 edge	none	no
2005	e	213	obsidian	frosty	Orito	rough flake/ mata'a	1	13x47x62	opposing notches forming rudimentary tang	battered	no
2005	e	216	obsidian	frosty	Orito	flake	1	16x50x60	none	battered	none
2005	e	n/a	flow lava	tabular	Kau	rough flakes	4	8x14x24, 4x24x27, 12x14x50 & 15x25x53	smallest has pre-flaking smoothing, the largest preflaking dressing		
2005	e	n/a	flow lava	?local breccia	Puna Pau	rough flake	1	10x30x32	none	none	no



Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2005	e	n/a	flow lava	hard	Viringa o Tuki	very rough flake	1	5x15x47	some preflaking smoothing	none	no
2005	e	n/a	flow lava	hard, finely vesicular	outside crater	fire-cracked	3	pebble	none	none	no
2005	f	n/a	obsidian	glossy	Kau	chips/microflakes	4	granule	none	none	no
2005	f	n/a	obsidian	glossy	Kau	very rough flake	1	9x22x33	none	none	no
2005	f	n/a	obsidian	frosty	Orito	microflakes	4	1x5x8-3x14x16	none	none	no
2005	f	n/a	obsidian	frosty	Orito	retouched flake	1	13x31x53	blunted along one edge; opposing, curved edge shows traces of (?) cutting damage	none	no
2005	f	n/a	obsidian	frosty	Orito	utilized flake (triangular)	1	12X30x47	scraper damage	none	oh/ no
2005	f	n/a	obsidian	frosty	Orito	rough (?) utilized flakes	2	12x37x54 & 17x26x49	possible usewear	none	no
2005	f	n/a	obsidian	frosty	Orito	rough flake	1	7x27x35	none	none	no
2005	f	n/a	obsidian	frosty	Orito	chip	1	15x16x30	none	none	no
2005	f	n/a	flow lava	tabular	Kau	rough flakes	3	11x40x52, 17x39x50 & 14x37x67	pre-flake dressing on largest flake	none	no
2005	f	n/a	flow lava	tabular	Kau	butt end of toki	1	17x48x55	pre-breakage dressing on both sides of tool but completely blunt end with minor flaking around edges	none	yes/ yes
2005	f	n/a	flow lava	tabular	Kau	toki tip (rounded blade)	1	10x63x64	none	none	no
2005	f	n/a	flow lava	tabular	Kau	toki tip (pointed blade)	1	22x62(wide) x98	dressed along 1 edge, tranchet flaked; all pre-breakage edges slightly worn	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2005	f	n/a	flow lava	?local breccia	Puna Pau	(?)rough flake/ fire spall	1	7x35x56	none	none	no
2005	f	214	flow lava	hard, finely vesicular	outside crater	fire-cracked	1	25x105x180	none	none	no
2005	f	215	flow lava	hard, finely vesicular	outside crater	toki tip (pointed blade)	1		visibly dressed along oneside; cutting edge slightly smoothed with clear longitudinal stria in surviving cortex	none	no/ yes
2005	g	n/a	obsidian	frosty	Orito	microchips & flakes	59	1x4x5-2x18x23	none	small pronounced bulbs — trimming debitage	no
2005	g	n/a	obsidian	frosty	Orito	rough flakes	4	2x11x27, 4x16x28, 15x29x31 & 10x23x43	none	none	no
2005	g	n/a	obsidian	frosty	Orito	rough (?)utilized flake/ chip	1	11x24x26	scraping damage in concave edge	none	no
2005	g	n/a	obsidian	frosty	Orito	utilized flake	1	10x27x27	(?) scraping damage on curved edge	from blunted core	
2005	g	n/a	obsidian	frosty, greenish	none	(?) abortive/broken mata'a	1	10x40x50	has half a tang 'split) longitudinally	none	no
2005	g	218	obsidian	frosty	Orito	abortive core	1	42x64x70	none	very few obvious strikes on a poor quality piece of stone	no
2005	g	n/a	flow lava	tabular	Kau	(?)fire spalls	5	1x10x14-9x26x50	none	none	no
2005	g	n/a	flow lava	tabular	Kau	(?)fire spall	1	15x32x60	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2005	g	n/a	flow lava	hard & non-vesicular with water rolled facets	beach	fire spalls (from poro)	4	2x10x10-10-28x36	none	none	no
2005	g	n/a	flow lava	hard, finely vesicular	outside crater	(?)fire spalls	20	1x10x14-9x26x50	none	none	no
2005	g	n/a	flow lava	hard, finely vesicular	outside crater	burnt stone	1	30x75x113	none	looks fortuitously like a rounded toki end	no
2005	h	n/a	obsidian	glossy-frosty	none	chip & flake	2	granule	none	none	no
2005	h	n/a	obsidian	frosty	Orito	very rough flake	1	17x35x60	none	none	no
2005	h	n/a	obsidian	frosty	Orito	flakes	3	4x16x18, 1x15x22 & 4x22x30	none	none	no
2005	h	n/a	obsidian	frosty	Orito	micro-blades, flakes & chips	6	1x3x6-2x8x30	none	none	no
2005	h	217	obsidian	frosty	Orito	core/ (?)chopper	1	20x77x87	blunting in notch opposite damaged edge	none	no
2005	h	n/a	flow lava	hard, non-vesicular	Rua toki toki	rough flake	1	11x35x60	none	none	no
2005	h	n/a	flow lava	tabular	Kau	rough flake	2	10x18x44 & 4x30x38	preflake smoothing	none	no
2005	h	n/a	flow lava	tabular	Kau	rough flake	3	8x29x58, 12x42x52 & 14x44x93	preflake dressing	none	no
2005	h	n/a	flow lava	tabular	Kau	rough flakes	6	3x23x38-14x40x65	none	none	no
2005	h	n/a	flow lava	hard, non-vesicular	(?) beach	rough flake	1	6x29x40	water wear or preflake smoothing	none	no
2005	h	n/a	flow lava	hard, finely vesicular	outside crater	fire spalls	99	small pebble	none	none	no
2005	h	n/a	flow lava	?local breccia	Puna Pau	fire spalls	11	small pebble	none	none	no
2005	i	n/a	obsidian	frosty	Orito	flake (triangular)	1	6x20x35	not obvious	none	no
2006	a	n/a	obsidian	glossy	Kau	flake core	1	22x28x38	none	cortex used as main striking platform	no
2006	a	n/a	flow lava	tabular	Kau	flake	1	10x32x50	traces of preflaking dressing	struck from edge of toki	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2006	a	n/a	flow lava	tabular	Kau	rough flake	3	2x10x24, 5x15x34 & 9x21x42	none	none	no
2006	a	n/a	flow lava	tabular	Kau	chunk	1	22x34x53	none	none	no
2006	b	n/a	obsidian	frosty	Orito	flake	1	2x11x18	none	none	no
2006	b	n/a	flow lava	tabular	Kau	flake	1	8x27x45	possible preflaking dressing & light smoothing	none	no
2006	b	n/a	flow lava	tabular	Kau	flakes	13	1x5x8-4x20x36	none	none	no
2006	b	219	flow lava	hard & non-vesicular	none (not local to Puna Pau)	toki/ utilized retouched flake	1	27x75x105	slight rounding of most edges	hand-sized — not	yes/ yes
2006	c	n/a	obsidian	frosty	Orito	flake	1	4x15x22	none	none	no
2006	c	n/a	flow lava	tabular	Kau	toki end (straight - rounded blade)	1	35x60(wide)x60	slight pre dressing wear — none on extant edge	abortive re-sharpening	no
2006	c	n/a	flow lava	tabular	Kau	rough flake	1	13x34x54	preflaking smoothing	none	no
2006	c	n/a	flow lava	tabular	Kau	flake & rough flake	2	9x30x33 & 7x34x44	none	none	no
2006	c	n/a	flow lava	tabular	Kau	chips	2	granule	none	none	no
2006	d	n/a	obsidian	glossy	Kau	flake (?)from blunted core	1	2x14x20	not certain	none	no
2006	d	n/a	obsidian	frosty	Orito	(?) utilized flake	1	4x11x20	(?) abrasion on long/ slightly incurved edge	none	no
2006	d	n/a	obsidian	frosty	Orito	rough flakes	1	14x30x38	none	none	no
2006	d	n/a	obsidian	frosty	Orito	rough flakes	4	1x6x8-2x10x13	none	none	no
2006	d	n/a	flow lava	tabular	Kau	rough flakes	4	4x12x18-8x30x49	preflaking smoothing	largest from toki with pointed end	no
2006	d	n/a	flow lava	tabular	Kau	rough flakes	3	6x21x31-10x25x37	preflaking dressing	none	no
2006	d	n/a	flow lava	tabular	Kau	flakes	6	3x14x14-4x22x26	none	none	no
2006	d	n/a	flow lava	tabular	Kau	chip	1	granule	none	none	no
2006	e	n/a	obsidian	frosty	Orito	micro flake	1	1x5x10(wide)	none	none	no
2006	d	n/a	flow lava	tabular	Kau	rough flakes	2	2x13x20 & 5x20x31	none	none	no
2006	d	n/a	flow lava	tabular	Kau	fire-fracture	1	6x20x29	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2006	f	n/a	obsidian	frosty	Orito	rough blade	1	2x10x30	none	none	oh/ no
2006	f	n/a	flow lava	tabular	Kau	rough blade	1	7x18x45	none	none	no
2006	g	n/a	obsidian	glossy	Kau	rough flake	1	5x20x20	scraper damage	none	no
2006	g	n/a	obsidian	frosty/ speckled	Kau	rough (?) utilized flake	1	17x40x75	edge of bulb blunted	none	no
2006	g	n/a	obsidian	frosty	Orito	rough utilized flake	1	9x30x50	scraper damage on curved edge	none	no
2006	g	n/a	obsidian	frosty	Orito	(?) utilized flake	1	5x32x40	abrasion on incurved edge	none	no
2006	g	n/a	obsidian	frosty	Orito	flake	1	3x17x22	none	none	no
2006	g	n/a	obsidian	frosty	Orito	chip	1	granule	none	none	no
2006	g	n/a	flow lava	tabular	Kau	rough flakes	3	6x9x16-4x16x28	none	none	no
2006	g	n/a	flow lava	tabular	(?)Kau	fire spalls	4	2x8x204x15x20	none	none	no
2006	g	n/a	hard & non-vesicular with water rolled facets	beach	fire spalls (from poro)	fire spalls	4	4x16x17-5x33x40	none	none	no
2006	g	n/a	flow lava	hard, finely vesicular	outside crater	chunks & flakes of burnt stone	10	5x18x20-medium pebble	none	none	no
2007	a	n/a	obsidian	frosty	Orito	rough utilized flake (heart-shaped)	1	5x18x28	scraping damage in notch of heart	none	no
2007	a	n/a	obsidian	frosty	Orito	chip	2	small pebble	one with blunted edge	none	no
2007	a	n/a	obsidian	frosty	Orito	rough flake/ core	1	18x45x45	none	none	no
2007	a	n/a	obsidian	frosty	Orito	rough flakes	3	5x4x14-4x15x18	none	none	no
2007	a	n/a	lava	finely porphyritic	Viringa o Tuki	toki tip ('round' section-type)	1	22x43x55	smoothed end with longitudinal stria	none	no
2007	a	n/a	flow lava	tabular	Kau	rough flakes	2	10x40x60 & 8x23x35	preflaking dressing		no
2007	a	n/a	flow lava	tabular	Kau	rough flakes	4	7x13x37-13x57x90	preflaking dressing & smoothing		no
2007	a	n/a	flow lava	tabular	Kau	rough flakes	8	3x14x19- 7x35x42	preflaking smoothing		no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2007	a	n/a	flow lava	tabular	Kau	rough flakes	50	1x6x11-7x56x63	none	none	no
2007	a	n/a	flow lava	tabular	Kau	rough flakes	11	2x11x13	none	probably burnt	no
2007	a	226	flow lava	tabular	Kau	toki tip (rounded blade)	1	21x55x55	light smoothing	burnt	no/ yes
2007	a	n/a	flow lava	hard, finely vesicular	outside crater	rough flake	1	8x21x45	none	none	no
2007	b	n/a	obsidian	glossy	Kau	chunk	1	small-medium pebble	none	none	no
2007	b	n/a	obsidian	frosty	Orito	rough flake	1	11x27x40	none	artefactual fracture smoothed as if by water	no
2007	b	n/a	flow lava	tabular	Kau	rough flake	3	9x30x45-10x31x55	preflaking dressing	none	no
2007	b	n/a	flow lava	tabular	Kau	fire spall	1	4x8x32	prespalling dressing	none	no
2007	b	n/a	flow lava	tabular	Kau	rough flakes	2	5x20x24 & 5x23x34	preflaking smoothing	smaller burnt	no
2007	b	n/a	flow lava	tabular	Kau	rough flake	1	11x40x73	none	burnt	no
2007	b	n/a	flow lava	tabular	Kau	rough flakes	43	2x10x19-7x48x67	none	none	no
2007	b	n/a	flow lava	tabular	Kau	rough flakes & (?) fire spalls	11	2x13x15-9x22x34	none	burnt	no



Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2007	b	n/a	flow lava	hard, finely vesicular	outside crater	toki end ('round' section-type)	1	50x70x170	flaked, very light smoothing around point	possibly burnt	no
2007	b	n/a	flow lava	hard, finely vesicular	outside crater	rough flake	1	13x37x65	none	none	no
2007	c	n/a	obsidian	frosty	Orito	rough flake	1	2x9x12	unknown	none	no
2007	c	n/a	flow lava	tabular	Kau	rough flakes & (?) fire spalls	6	granule	none	none	no
2007	d	n/a	obsidian	unknown	none	chip	1	granule	none	none	no
2007	d	n/a	flow lava	tabular	Kau	rough flakes	2	3x18x23 & 10x32x33	preflaking smoothing	none	no
2007	d	n/a	flow lava	tabular	Kau	rough flakes	26	1x5x10-7x32x50	none	none	no
2007	d	n/a	flow lava	hard, finely vesicular	outside crater	rough flake	1	8x30x36	none	none	no
2007	e	n/a	obsidian	glossy	Kau	rough flake	1	2x10x20	none	none	no
2007	e	n/a	obsidian	glossy	Kau	chip	1	9x12x23	none	none	no
2007	e	n/a	obsidian	frosty	Orito	chip & rough flakes	4	1x5x5-9x13x24	possibly the largest	none	no
2007	e	n/a	flow lava	tabular	Kau	chunk	1	13x60x80	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2007	e	n/a	flow lava	tabular	Kau	rough flakes	10	1x6x7-8x32x42	smallest & largest have preflaking smoothing	none	no
2007	f	n/a	obsidian	frosty	Orito	utilized flake	1	10x22x33	heavily abraded rounded edge	none	no
2007	f	n/a	flow lava	tabular	Kau	rough flakes	2	2x12x19 & 10x26x38	no	larger burnt	no
2007	f	n/a	flow lava	hard, finely vesicular	outside crater	burnt stone	2	2x10x15 & 17x20x28	none	none	no
2007	f	n/a	lava	finely porphyritic	Viringa o Tuki	burnt stone	1	16x20x35	none	none	no
2007	n/a	256	obsidian	frosty	Orito	utilized flake	1	16x58x77	scraper & cutting damage	none	oh/ no
2009	a	n/a	obsidian	frosty	Orito	rough flake	1	5x24x33	damaged	none	oh/ no
2009	a	n/a	flow lava	tabular	Kau	rough flakes	9	2x10x15-6x6x22x42	2 smallest burnt	none	no
2010	e	n/a	obsidian	frosty	Orito	utilized flake	1	5x18x21	yes	none	no
2010	e	n/a	obsidian	frosty	Orito	chip	1	granule	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2010	e		flow lava	hard, finely vesicular & (?) tabular	outside crater & (?) Kau	fire spalls	16	1x4x5-5x20x22	none	none	no
2010	f	n/a	obsidian	glossy	Kau	rough flakes	2	9x30x38 & 15x32x35	not obvious	second from blunted core	no
2010	f	n/a	obsidian	frosty	Orito	flake	1	1x11x17	none	none	no
2010	f	n/a	obsidian	frosty	Orito	chip	1	12x20x26	none	none	no
2010	f	n/a	flow lava	tabular	Kau	rough flakes & (?) fire spalls	7	1x7x7-3x22x22	none	none	no
2010	f	n/a	flow lava	hard, finely vesicular	outside crater	fire spalls	5	2x17x27-13x30x41	none	none	no
2010	g	n/a	obsidian	frosty	Orito	rough utilized flake (triangular)	1	5x19x21	scraping wear on one edge	none	no
2010	g	n/a	obsidian	frosty	Orito	broken utilized flake	1	8x18x35	probable wear on end of broken edge	none	no
2010	g	n/a	obsidian	frosty	Orito	rough flakes & chips	3	2x14x14-6x16x18	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2010	g	n/a	flow lava	tabular	Kau	rough flakes	1	6x21x24	preflaking smoothing	burnt	no
2010	g	n/a	flow lava	tabular	Kau	rough flakes	5	4x18x27-10x25x38	none	none	no
2010	g	n/a	flow lava	tabular	Kau	chunk	1	small-medium pebble	none	none	no
2010	g	n/a	lava	finely porphyritic	Viringa o Tuki	(?) toki tip	1	15x22x52 (curved)	prefracture smoothing	burnt	no
2010	g	n/a	lava	local breccia	Puna Pau	burnt stone	1	small-medium pebble	none	none	no
2010	g	n/a	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small-medium pebble	none	none	no
2010	g	n/a	flow lava	mostly hard, finely vesicular but includes tabular	non-local as above	fire spalls	83	1x7x10-9x34x39 (mostly granules)	none	none	no
2010	h	n/a	obsidian	frosty	Orito	flake	1	5x31x32	none	none	no
2010	h	n/a	obsidian	frosty	Orito	primary flake	1	23x55x65	none	much cortex	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2010	h	n/a	obsidian	glossy & porphyritic	Kau	utilized chips	1	3x6x9 & 8x12x30	abrasion on the larger; scraper damage on the smaller	the smaller is presumably broken from a larger tool	no
2010	h	n/a	flow lava	tabular	Kau	flake	1	6x30x41	preflaking smoothing on opposing facets	tip of toki	no
2010	h	n/a	flow lava	tabular	Kau	chunk	8	2x9x14-4x26x50	none	may include some burnt	no
2010	h	n/a	flow lava	tabular & hard, finely vesicular	Kau & outside crater	burnt stone/ fire spalls	44	1x4x7-11x20x30	none	possibly includes some flakes	no
2010	i	n/a	obsidian	frosty	Orito	flake	1	4x16x22	none	none	no
2011	f	n/a	obsidian	glossy	Kau	core	1	20x38x64	edge damage in hollow of modified striking platform	none	oh/ no
2011	f	n/a	flow lava	tabular	Kau	flake	1	2x22x36	none	none	no
2012	n/a	n/a	obsidian	glossy	Kau	(?)utilized flake	1	6x25x43	possibly	none	no
2012	n/a	n/a	obsidian	frosty	Orito	(?)utilized flake	1	4x21x27	possibly	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2012	n/a	n/a	flow lava	tabular	Kau	triangular tool	1	14x51x86	prepared edge with straight tranchet blade; faint ware on both	none	yes/ yes
2012	n/a	n/a	flow lava	tabular, hard, finely vesicular & water rolled	Kau, outside crater & beach	burnt stone/ fire spalls	5	1x3x5-16x22x36	none	none	no
2013	g	220	flow lava	hard, sparsely vesicular	outside crater	burnt stone	1	very large cobble-small boulder	none	sub-angular, fire fractured	no
2013	g	228	lava	local breccia	Puna Pau	burnt stone	1	medium pebble	none	sub angular spalled	no
2013	g	229	lava	hard, non-vesicular, water rolled	beach	broken hammerstone	1	pebble	end batter	possibly fire fractured	no
2013	g	230	flow lava	hard, finely vesicular	outside crater	burnt stone	1	large pebble	none	angular spalled	no
2013	g	231	lava	local breccia	Puna Pau	burnt stone	1	medium pebble	elongated	none	no
2013	g	232	flow lava	hard, finely vesicular	outside crater	burnt stone/ flake	1	9x21x28	none	none	no



Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2013	g	233	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small cobble	none	none	no
2013	g	234	obsidian	frosty	Orito	semi circular scraper	1	17x51x70	heavily retouched on rounded edge (including striking platform)	not burnt	yes/ yes
2013	g	235	flow lava	hard, finely vesicular	outside crater	fire spall	1	13x55x70	none	none	no
2013	g	236	flow lava	hard, finely vesicular	outside crater	fire spall	1	11x42x45	none	none	no
2013	g	237	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small cobble	none	sub angular spalled	no
2013	g	238	lava	finely porphyritic	Viringa o Tuki	hammerstone	1	medium—large pebble	batter on ends & one side	none	yes/ yes
2013	g	239	lava	local breccia	Puna Pau	burnt stone	1	very large pebble	none	rounded but not obviously artefactual	no
2013	g	240	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small cobble	none	none	no
2013	g	241	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small cobble	none	angular spalled	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2013	g	242	flow lava	n/a	Kau	burnt stone	1	large pebble	none	angular	no
2013	g	243	flow lava	tabular	Kau	burnt stone	1	30x75x98	faint traces of possible prespalling wear	angular	no
2013	g	244	flow lava	hard, finely vesicular	outside crater	burnt stone	1	33x38x165	none	none	no
2013	g	245	flow lava	unknown	none	burnt stone	1	very large cobble	no	sub rounded, fire cracked	no
2013	g	247	flow lava	hard, finely vesicular	outside crater	burnt stone	1	cobble	no	sub angular, fire cracked	no
2013	g	248	flow lava	unknown	none	burnt stone	1	large pebble	none	sub angular, spalled	no
2013	g	249	flow lava	hard, non-vesicular water rolled	beach	burnt poro	1	pebble large-cobble	none	none	no
2013	g	250	flow lava	hard, finely vesicular	outside crater	burnt stone	1	very large cobble	none	tabular	no
2013	g	251	flow lava	hard, finely vesicular	outside crater	burnt stone	1	small cobble	none	angular	no
2013	g	252	flow lava	hard, finely vesicular	outside crater	burnt stone	1	cobble	none	sub angular, fire cracked	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2013	g	253	lava	looks like local breccia	none	burnt stone	1	small-medium cobble	none	sub rounded but fire cracked	no
2013	g	254	flow lava	tabular	Kau	burnt stone	1	large pebble	none	angular, spalled (broken to ID)	no
2013	g	255x1	flow lava	hard, moderate small phenocrysts, coarse matrix	unknown	whole toki (pointed end with rounded section)	1	175 long; circumference 65-70	faint wear on ends	point of one end broken; soot soaked	yes/ yes
2013	g	255x2	flow lava	non vesicular, water rolled	beach	burnt poro	1	large pebble	none	spalled; not the same stone as 249	no
2013	g	n/a	flow lavas as above	as above	as above	burnt stone	16	large pebbles to small boulders	no	roundedangular fire cracked, spalled	no
2013	g	n/a	lava	local breccia	none	stone	many	not retained	unknown	some certainly burned	no
2013	g	n/a	red scoria & scoriaceous stone		Puna Pau	stone	4	cobble	no	not burned	no
2013	n/a	221	flow lava	hard, finely vesicular	outside crater	burnt stone	1	very large cobble	none	sub round, fire cracked	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2013	n/a	222	flow lava	non vesicular, water rolled	beach	hammerstone	1	very large pebble	heavily battered one end; battered & fractured at other	not obviously burnt	no/ yes
2013	n/a	223	flow lava	non vesicular	none	burnt stone	1	small cobble	none obvious	angular, spalled & fire cracked	no
2013	n/a	224	flow lava	tabular	Kau	flake/ fire spall	1	9x70x101	pre-spall/ flaking dressing	possibly burnt	no
2013	n/a	225	flow lava	hard, finely vesicular	outside crater	fire spall	1	10x30x52	none	none	no
2013	n/a	227	flow lava	hard, finely vesicular	outside crater	fire spall	1	9x50x73	none	none	no
2014	e	n/a	obsidian	glossy	Kau	rough utilized flake	1	(?)6x19x24	yes	none	oh/ no
2014	e	n/a	obsidian	glossy	Kau	rough blade	1	2x4x18	none	none	no
2014	e	n/a	flow lava	tabular	Kau	flakes	7	2x10x18-6x29x47	none	one burnt	no
2014	e	n/a	flow lava	hard, finely vesicular	outside crater	flake	1	5x20x37	none	none	no
2014	e	n/a	flow lava	hard non-vesicular water rolled	beach	fire spalls from poro	3	5x13x13-5x20x29	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2014	f	n/a	obsidian	frosty	Orito	flake	1	6x18x25	none	none	no
2014	f	n/a	flow lava	tabular	Kau	flakes	2	9x40x48 & 14x28x53	none	1 possibly burnt	no
2014	f	n/a	flow lava	tabular	Kau	flakes	10	3x11x22-7x26x26	1 with pre-flaking smoothing	3 burnt	no
2014	f	n/a	lava	finely porphyritic	Viringa o Tuki	(?) burnt stone	1	pebble	none	angular (?fire spalled)	no
2014	f	n/a	flow lava	hard, finely vesicular	outside crater	burnt stone	1	large pebble	none	none	no
2014	f	n/a	flow lava	hard non-vesicular	none	burnt stone	1	pebble	none	none	no
2014	f	n/a	flow lava	vesicular and non-vesicular water-rolled	beach	burnt poro frags	6	pebble to small cobble	none	fire fractures	no
2014	f	n/a	flow lava	hard non-vesicular	beach	fire spall from poro	1	7x22x30	none	water rolled facet	no
				water rolled							
2014	g	n/a	flow lava	tabular	Kau	flakes	17	1x8x11-733x50	2 with preflaking smothing	some possible soot soaking	no
2014	g	n/a	flow lava	hard, finely vesicular	outside crater	burnt stone	3	4x10x20-7x40x50	none	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2014	h	n/a	obsidian	glossy	Kau	rough utilized flake	1	8x23x43	scraper damage on one long edge	from a (?)blunted core	no
2014	h	n/a	obsidian	glossy	Kau	chunk	1	small pebble	none	none	no
2014	h	n/a	flow lava	tabular	Kau	chunks & flakes	4	17x28x49–32x63x85	one with preflaking dressing	probably some burning	no
2014	h	n/a	flow lava	tabular	Kau	flakes	3	2x21x35–3x25x47	none	none	no
2014	h	n/a	lava	finely porphyritic	Viringa o Tuki	(?) burnt stone	1	13x32x59	none	angular (?)fire spalled)	no
2014	h	n/a	lava	not identified	non-local	burnt stone	6	pebbles to cobbles	none	fire fractured	no
2016	g	n/a	obsidian	glossy	Kau	flake	1	5x26x42	not obvious	none	no
2016	g	n/a	obsidian	frosty	Orito	rough flakes	2	5x12x12 & 8x12x25	none	none	no
2016	g	n/a	flow lava	tabular & hard, finely vesicular	Kau & outside crater	flakes & spalls	77	2x6x12–6x55x63	none	not easily distinguishable owing to wetness but mostly fire spalls	no
2017	g	n/a	obsidian	frosty	Orito	rough utilized flake	1	4x10x19	scraper damage on incurve	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2017	g	n/a	flow lava	tabular	Kau	fire spalls	300+	1x4x5-20x68x80 (qty clasts decreases as size increases)	none	should be the base of a burnt feature	no/ yes
2017	g	n/a	flow lava	hard, finely vesicular	outside crater	fire spalls	69	1x5x10-28x50x85 (qty clasts decreases as size increases)	none	should be the base of a burnt feature	no/ yes
2017	g	n/a	flow lava	non-vesicular, water rolled	beach	fire spalls	11	4x15x37-15x51x80	none	should be the base of a burnt feature	no/ yes
2020	a	n/a	obsidian	glossy	Kau	rough (?) utilized flake	1	14x29x35	probably wear / damage on two edges	none	no
2020	a	n/a	obsidian	frosty	Orito	rough flakes	2	9x16x35 & 10x34x44	larger with traces of blunting	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2020	a	n/a	flow lava	tabular	Kau	rough flakes	8	2x9x22-10x33x72	largest has traces of preflake dressing and smoothing, one traces of preflake smoothing alone	none	no
2020	b	n/a	obsidian	glossy	Kau	rough flakes	3	5x20x20-10x16x29	impossible to tell owing to damage	none	no
2020	b	n/a	obsidian	frosty	Orito	(?) end of broken core tool	1	17x41x41	possible hafting wear at break	none	no
2020	b	n/a	obsidian	frosty	Orito	utilized core rejuvenation flake	1	17x28x42	damaged	from blunted core	no
2020	b	n/a	obsidian	frosty	Orito	rough utilized flakes	4	3x15x24-4x19x31	scraper damage (largest) & abrasion	none	no
2020	b	n/a	obsidian	frosty	Orito	microflake	1	1x4x9	none	none	no
2020	b	n/a	flow lava	tabular	Kau	rough flake	1	20x70x77	none	none	no



Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2020	b	n/a	flow lava	tabular	Kau	rough flake	1	11x36x66	pre-flaking batter	none	no
2020	b	n/a	flow lava	tabular	Kau	rough flakes	4	3x12x19-4x20x38	none	none	no
2020	b	n/a	flow lava	hard, very sparsely vesicular	none	flaked but formless chunk	1	43x98x140	light wear on narrow edge	opportunistic tool	
2020	c	n/a	flow lava	tabular	(?) Kau	rough flakes	6	1x13x16-10x20x50	none	not easily distinguishable type(s) owing to wetness	no
2020	d	n/a	obsidian	glossy	Kau	chips/chunks	2	7x18x22	nothing obvious	none	no
2020	d	n/a	obsidian	frosty	Orito	rough utilized blade	1	6x15x32	scraping damage on two edges	none	no
2020	d	n/a	obsidian	frosty	Orito	rough (?)utilized blade	1	3x9x27	possible use damage on narrow square end	none	no
2020	d	n/a	flow lava	tabular	Kau	rough flakes	3	2x12x23-8x35x53	pre flake smoothing; preflake dressing in middle sized flake	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2020	d	n/a	flow lava	tabular	Kau	rough flakes	7	3x17x25-17x55x74	3-4 may be fire spalls	none	no
2020	d	n/a	flow lava	hard, non-vesicular, water-rolled	beach	burnt stone	1	small pebble	none	fire spalled	no
2021	a (spit 2)	n/a	obsidian	glossy	Kau	flake (thick)	1	7x23x23	none	none	no
2021	a (spit 2)	n/a	obsidian	frosty	Orito	microflake	1	1x6x8	none	none	no
2021	a (spit 2)	n/a	flow lava	tabular	Kau	rough flakes	1	8x20x29	preflaking smoothing on two opposing edges	toki tip	no
2021	b	n/a	obsidian	glossy	Kau	rough utilized flake	1	8x25x30	wear between horns and on one	horned	no
2021	b	n/a	obsidian	glossy	Kau	crested blade	1	6x13x25	one edge abraded	none	no
2021	b	n/a	obsidian	glossy	Kau	chip & flake	3	3x4x16-	not obviously	none	no
2021	b	n/a	obsidian	frosty	Orito	rough (?) utilized flakes	3	2x14x20-4x22x30	in incurves and on points	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2021	b	n/a	flow lava	tabular	Kau	rough flakes	1	15x35x93	preflaking dressing (used as striking platform)	none	no
2021	b	n/a	flow lava	tabular	Kau	rough flakes	1	7x22x40	preflaking smoothing	burnt	no
2021	b	n/a	flow lava	tabular	Kau	rough flakes	9	2x10x18-10x31x48 & 7x25x54	none	none	no
2021	b	n/a	flow lava	tabular	Kau	rough flake or fire spall	1	5x24x36	none	burnt	no
2021	b	n/a	flow lava	hard, non-vesicular	beach	burnt stone	1	8x18x25	none	water rolled and chatter marked facet	no
2021	b	n/a	flow lava	finely vesicular, water rolled	beach	burnt stone	1	medium-large pebble	none	fire cracked, water rolled facet	
2021	c	n/a	flow lava	tabular	Kau	rough flake or fire spall	1	16x60x73	none	none	no
2021	c (spit 2)	n/a	obsidian	frosty	Orito	utilized flake (square)	1	7x32x37	wear on one corner & in concave edge	none	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2021	c (spit 2)	n/a	flow lava	tabular	Kau	rough flakes & (?) fire spalls	2	6x20x40-10x19x61 & 15x35x40	none	2 burnt	no
2021	d	n/a	flow lava	tabular	Kau	rough flakes & (?) fire spalls	12	1x9x17-9x43x69	one with pre flake/ spall dressing	most burnt	no
2021	d	n/a	flow lava	tabular	Kau	rough flake	1	5x31x40	preflake smoothing	none	no
2021	d	n/a	flow lava	hard, finely vesicular	outside crater	fire spall	1	2x33x40	none	none	no
2021	e	n/a	flow lava	tabular	Kau	rough flake	1	2x15x35	none	none	no
2021	f	n/a	obsidian	frosty	Orito	rough (?) utilized flake	1	9x21x30	possibly	none	no
2021	f	n/a	flow lava	tabular	Kau	toki tip (pointed edge)	1	21x43x50 (along pointed edge)	smoothed	possibly fire spalled surface	no
2021	f	n/a	flow lava	tabular	Kau	chunk	1	23x65x72	none	none	no
2021	f	n/a	flow lava	tabular	Kau	rough flake	29	2x8x17-8x40x73	5 preflake dressing; 3 preflake smoothing	9 burnt	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2021	f	n/a	flow lava	tabular	Kau	rough flakes or fire spalls	30	1x10x15-9x42x50	2 preflake dressing; 2 preflake smoothing	none	no
2021	f	n/a	lava	finely porphyritic	Viringa o Tuki	rough flake or fire spall	1	9x28x40	none	none	no
2021	g	n/a	flow lava	tabular	Kau	rough flake or fire spall	1	3x14x22	none	none	no
2021	h	n/a	obsidian	glossy	Kau	(?) utilized chip	1	granules	possibly	none	no
2021	h		obsidian	frosty	Orito	chip & flake	2	granules	none	none	no
2021	h	n/a	flow lava	tabular	Kau	rough flakes	28	3x11x23-10x32x58	1 preflake dressing, 1 preflake smoothing (fragment of toki tip)	6 burnt	no
2021	h	n/a	flow lava	tabular	Kau	rough flakes or fire spalls	17	1x7x12-5x22x39	none	probably mostly spalls	no
2021	h	n/a	lava	finely porphyritic	Viringa o Tuki	burnt stone	1		none	broken prior to burning	no
2021	i	n/a	flow lava	tabular	none	rough flake	1	13x24x32	none	possibly singed	no
2021	j	n/a	flow lava	tabular	Kau	rough flake	4	2x10x14-5x30x58	none	possibly singed	no

Context	Square	Sf no	Material	Variety	Suggested origin	Type of object	Qty	Size in mm or Wentworth scale	Usewear	Comments	Retained / photo
2021	j	n/a	lava	tabular (as 260)	none	rough flake	1	8x28x64	none	possibly singed	no
2021	n/a	260	lava	tabular	none	toki tip (pointed)	1	13x58x80	point only (c. 30cm) smoothed	very finely dressed	yes/ yes
2021	n/a	261	flow lava	tabular	Kau	re-utilized broken toki	1	30x107(original width)x82	some smoothing of broken edges	two transverse breaks	yes/ yes
2023	e	n/a	flow lava	tabular	Kau	rough flakes	2	7x21x43 & 12x28x68	smaller has preflake dressing	none	no
2023	f	n/a	flow lava	tabular	Kau	rough flakes	4	5x15x25-6x20x52	one has preflake smoothing on opposing sides (fragment of toki tip)	none	no
2024	f	n/a	flow lava	tabular	Kau	rough flakes	2	4x22x22 & 7x20x27	none	none	no